THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metal Trades.

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THE IRON AGE

THURSDAY, NOVEMBER 12, 1903.

Machine for Sinking Screw Piles.

Pennsylvania Railroad's Hudson River Tunnels.

Through the courtesy of Charles M. Jacobs, chief engineer of the North River Division of the Pennsylvania, New York & Long Island Railroad and the Pennsylvania, New Jersey & New York Railroad companies, we are enabled to present the following description of the apparatus which has been designed for sinking the piles upon which the two tunnels will rest. As our readers are aware, the twin tunnels will extend from Long Island, under the East River, New York City and the North River to New Jersey. Under the North River each tube will be supported upon a central row of screw piles, sunk to a depth of 150 feet if the nature of the material should make this necessary. Each pile consists of short cast iron cylindrical sections, bolted together, the outside diameter being 2 feet 3 inches and the thickness 1¼ inches. At the bottom is one turn of a cast steel screw having a pitch of 2[illegible] inches and a diameter of 4 2-3 feet.

In order to ascertain the possibility of sinking these piles to the depths desired, and to obtain the same conditions of ground as in actual work, a caisson was sunk at the outer end of the Erie Railroad Dock "C," Weehawken, at a point about 102 feet south of the center line of the proposed tunnel.

The piles used in these tests consisted of one screw point of steel and cylindrical cast iron sections 8 feet long, sufficient in number to bring the upper end of the pile above the dock. The point had a screw blade of one turn, 12 inches pitch, 5 feet diameter over all. The body of the point and also the pile sections were 30 inches in diameter. (It will be noted that these dimensions are slightly larger than those of the piles that will ultimately be used). The screw point and the lower sections of the pile were made with internal flanges bolted together with 12¼-inch bolts, and the upper sections were made with outside flanges which facilitated bolting together. For obvious reasons this latter method cannot be adopted in actual work.

Those at all familiar with the properties of the silt through which it was proposed to pass will appreciate the fact that tremendous turning power was required to screw the pile down against the cling of the silt to its sides. This power was provided by the machine shown

Fig. 1.—A Load of 300 Tons on Pile.

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in Figs. 2, 3 and 6. It is of the hydraulic class, consisting of two cylinders, A, attached to a frame and furnished with differential plungers 10 and 11½ inches in diameter by 18 inches stroke. The active area of the forward or driving stroke was, therefore, 78½ square inches, and the active area of the return stroke 25 square inches. The cylinders were tested to 1500 pounds per square inch. The frame was pivoted on a center casting, C, to which a ratchet wheel, D, was keyed; the center casting was bolted to the top of the pile when the machine was in operation. The thrust of the plungers was transmitted by means of connecting rods to the pawls B, which engaged the teeth of the ratchet wheel and were guided by the rim of the latter. The machine made 10 strokes for each revolution of the pile. It was operated by a controlling valve attached to the frame, and water was conveyed to it through a pipe with three swing joints. All the castings were of iron, and the whole machine weighed 12,000 pounds.

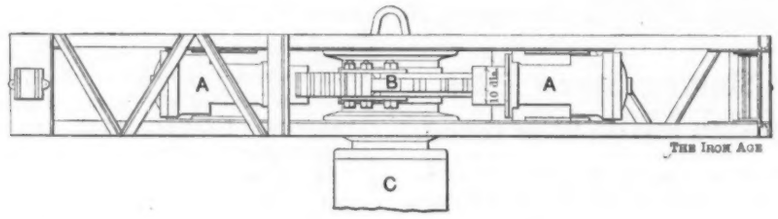

Fig. 2.—Side Elevation of Pile Sinking Machine.

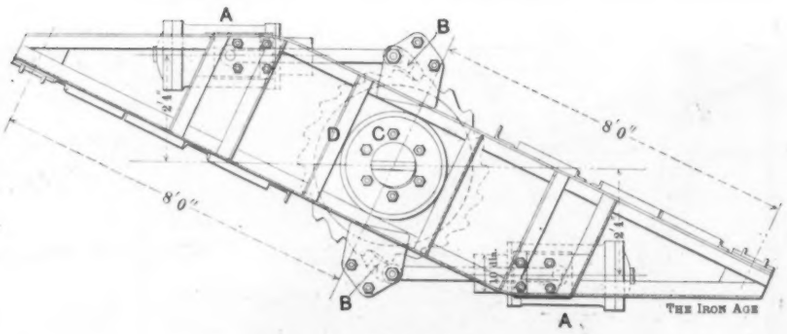

Fig. 3.—Plan of Fig. 2.

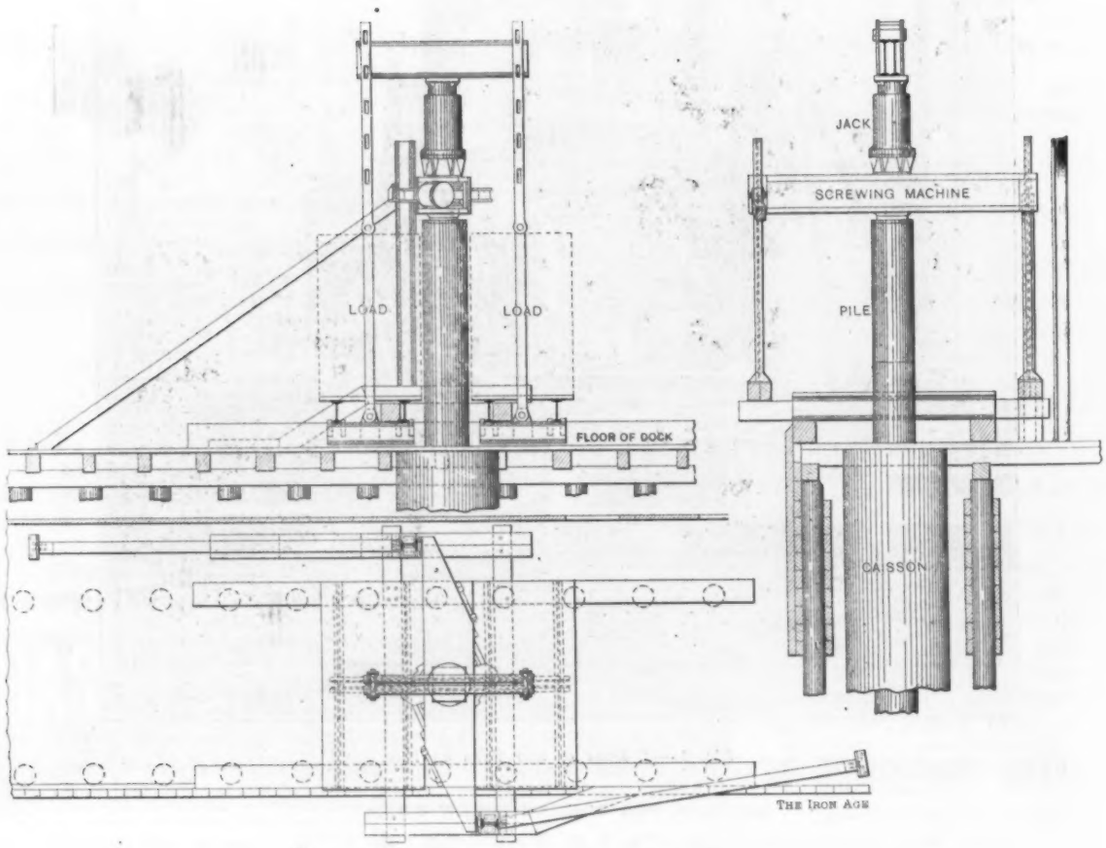

Fig. 4.—Elevations of Pile and Screwing Machine.

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It was anticipated that the weight of the pile might not be sufficient to force the pile down the full pitch of the screw blade, and a hydraulic jack, Fig. 4, was built for this purpose. It consisted of a cylinder with a simple plunger 18 inches in diameter by 25 inches stroke. The

reaction from this plunger was taken up by weights on two platforms, which were suspended from cross beams attached to the plunger of the jack.

Load on Pile.

The point of the screw pile was first bolted to eight sections and lowered in the caisson, and afterward seven more sections were added. The total weight of the pile was now 63,353 pounds.

At the first revolution the dead load, including the pile, was 82,395 pounds. The penetration was 1.17, the turning moment of the screwing machine 36,600 to 54,900 foot pounds, and the water pressure in the machine was from 100 to 150 pounds per square inch. At the seventh revolution the penetration was 1.04, the turning moment from 36,600 to 73,300 foot pounds, and the pressure from 100 to 200 pounds. At the fifteenth revolution the penetration was 0.833 foot, the turning moment 73,380 and the pressure 200 pounds. Up to the thirty-eighth revolution the penetration fluctuated between ½ and 1 foot. The load was then gradually increased to 383,330 pounds under operation of the hydraulic jack. The turning moment was 439,800 foot pounds, and the water pressure 1200 pounds. Before the completion of the fortieth revolution one of the pile sections broke under torsional strain; it was afterward found to be defective.

The actual time occupied (exclusive of all other work, such as placing sections, &c.) in screwing down 34 feet 10 1-32 inches in 38¾ turns was 9 hours and 5 minutes. This makes 14 minutes per turn, with an average penetration of 10 25-32 inches per turn.

The dead load tests occupied a period of five and one-half months. The load, including the pile itself, was gradually increased from 400,000 to 500,000 pounds by increments of 20,000 pounds. During the first five days the pile subsided about ¼ inch, and for every 20,000 pounds added thereafter the pile apparently subsided about 0.025 inch, but this was compression in the pile it-

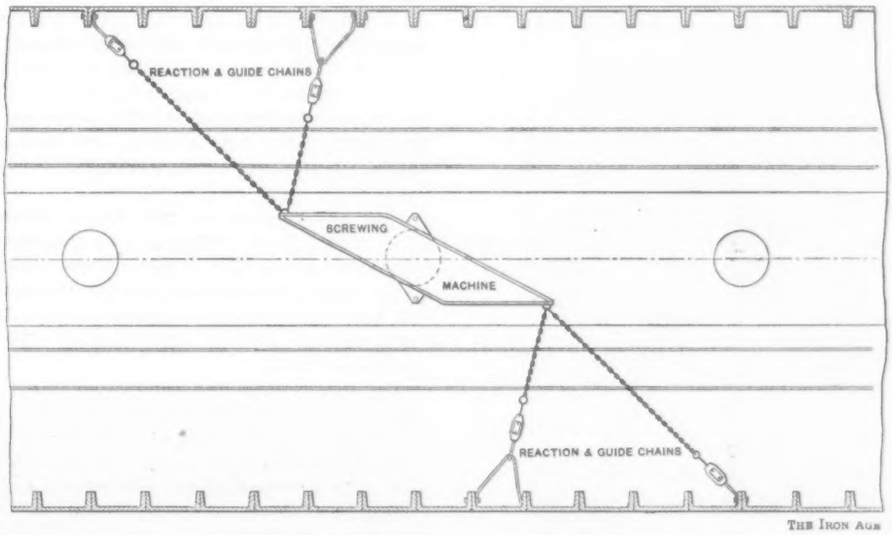

Fig. 5.—Plan Showing Machine in Tunnel.

Fig. 6.—View of Screwing Machine.

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self, which now measured 148 feet between the screw point and micrometer attachment. The 500,000 pounds was kept on for about one and one-half months, when the load was increased to 600,000 pounds, Fig. 1, for another month and a half without subsiding. The pile was then removed.

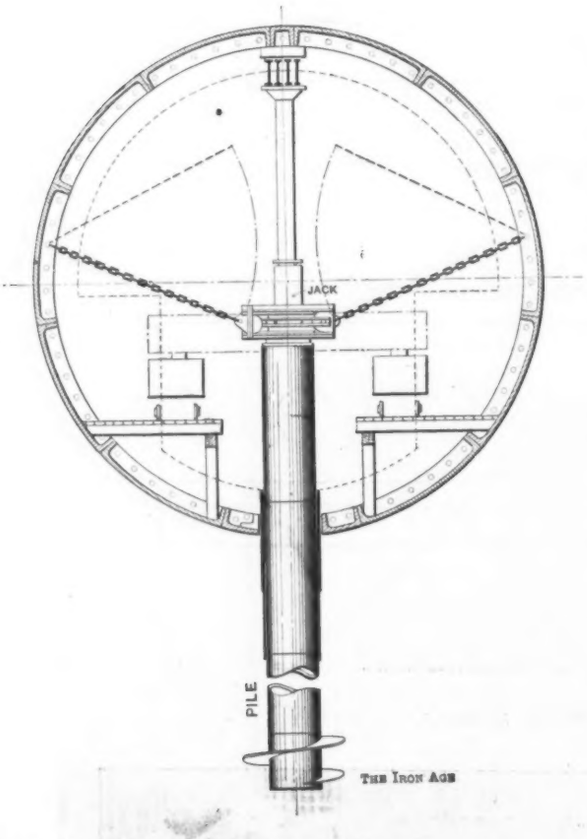

Fig. 7.—Cross Section.

But before this was done a series of drop tests was made, Fig. 10. A hammer of 3750 pounds, with a fall of 1 foot, was applied in 132 series of 250 drops each, while the dead load at the same time was increased from 200,000 to 330,000 pounds. Altogether, 33,000 blows were applied at a rate averaging 30 blows per minute without producing any appreciable effect.

The New Russian Tariff.

United States Consul Slocum, Warsaw, Russia, furnishes the following information about the new Russian tariff to the Department of Commerce and Labor:

The principal changes in the proposed tariff of interest to the manufacturers of the United States are as follows, the unit for assessment being the pood (36.112 pounds):

There will be an increase varying from 25 to 100 per cent. additional in iron and steel manufactures to the tariff in force at present.

Machines and apparatus, complete or incomplete, fitted together or in parts, of cast iron, wrought iron, or steel, with or without parts composed of other materials, even in combination with copper to an extent not exceeding 25 per cent. of the total weight of the machine, imported by the western land frontier, are assessed 3.06 rubles ($1.58) in the new tariff, against 2.10 rubles ($1.18) in the present tariff.

Gas and naphtha motors, steam engines, portable engines except those connected with complex thrashing machines and steam plows, locomotives, locomotive wagons, steam driven tricycles and electrical locomotives, pumps and hand fire engines, compressors, and ice making and refrigerating machines are assessed 4.38 rubles ($2.26) in the new tariff.

On typewriting and sewing machines the new duty will be 5.58 rubles ($2.87).

On all machines made of copper or its alloys, or in the composition of which copper or any alloy of copper is present in a proportion exceeding 25 per cent. of the total weight of the machine, the duty is raised from 6.48 rubles ($3.34) to 10.80 rubles ($5.56), an increase of $2.22.

Dynamo electrical machines and electric motors of all kinds and electrical transformers are raised from 2.10 rubles to 10.20 rubles ($1.08 to $5.25), an increase of $4.17.

Agricultural machines and implements, without steam motors, not separately designated, and also models thereof, are increased from 75 kopecks to 1.26 rubles (39 cents to 65 cents).

Portable engines connected with threshing machines and plows are increased from 75 kopecks to 90 kopecks (39 cents to 46 cents).

The following machines, &c., will be admitted free: Reaping and sheaf binding machines; reaping machines with automatic ejectors; steam plows; complicated clover thrashing machines with two drums; complicated steam

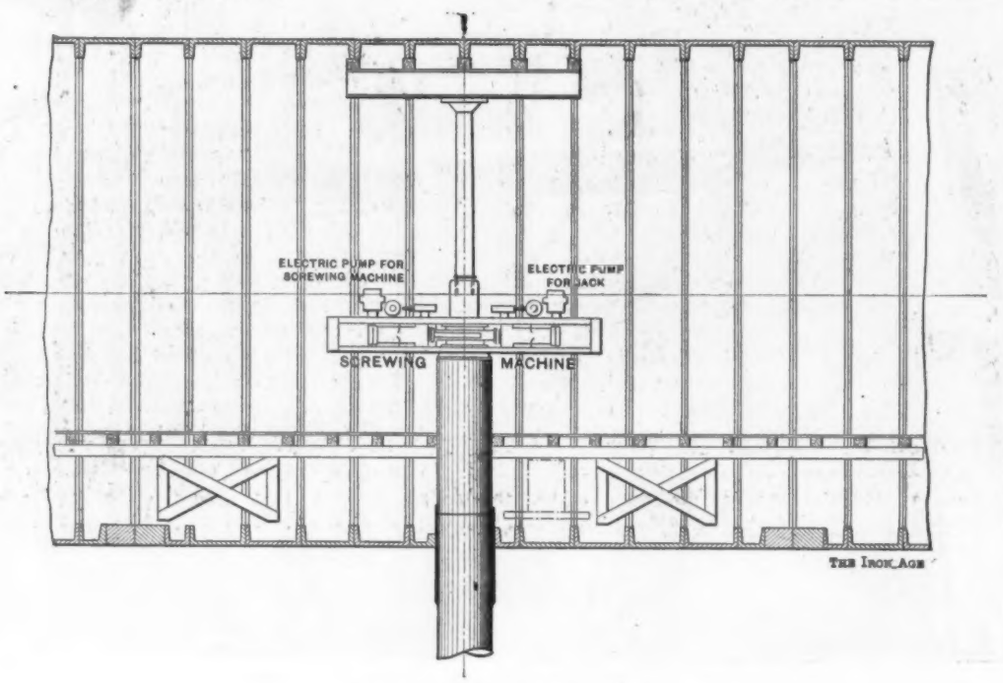

Fig. 8.—Longitudinal Section.

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threshers with beater drums, in which the length of the beaters is not less than 4 feet 6 inches, and with spike drums having a length of not less than 40 inches; hay tossing machines; raking machines, horse drawn; machines for sorting grass seed; sorting machines with spiral wire cylinders; potato sorting machines; machines for scattering powdered fertilizers; pulverizers; bellows and injectors for vines and trees; grape crushing machines; continuous wine pressing machines; centrifugal cream separators and parts thereof; all kinds of newly invented or perfected agricultural machines and implements ordered by experimenting stations and museums.

The Jones & Laughlin Steel Company 50 Years Old.

The Jones & Laughlin Steel Company, Pittsburgh, Pa., have passed the fiftieth milestone in their career, and seem well fortified to pass the one hundredth milestone and perhaps more. From the recent issue of the Pittsburgh *Times* we take the following interesting article regarding this well-known and popular company:

The inception of the present firm dates back several years before 1853, which is given as the birth year of the company. The late Benjamin F. Jones was manager of the Mechanics line of canal boats on the old Pittsburgh and Philadelphia canal. In 1846 he entered into partnership with John Kier, in the Independent line of canal boats. Shortly after Mr. Jones purchased from Mr. Kier an iron furnace and forges in the Alleghany Mountains, near Armagh, Westmoreland County. This was Mr. Jones' first venture in the iron business. In 1851 he became interested in the American Iron Works, then being built by Bernard Lauth. The firm were established under the name of Jones, Lauth & Co.

During the autumn of 1853 the Monongahela Iron Works, at Brownsville, Pa., were purchased by the new concern and operated for about two years. The plant was then dismantled, most of the machinery being removed to Pittsburgh.

In the meantime James Laughlin was admitted to the firm, the name of which was changed to Jones & Laughlin, and a few years later to Jones & Laughlins. Mr. Lauth retired from business in 1857. Under the limited liability act the firm name was changed to Jones & Laughlin, Limited, and it was while operating under this name that the company achieved such world wide renown. They are regarded as second in the United States to the United States Steel Corporation. Shortly before the death of Mr. Jones the name of the firm was changed to the Jones & Laughlin Steel Company, and such it is to-day. As far back as 1857 the firm of Jones & Laughlins established a large warehouse in Chicago.

The company employ thousands of men in their various mills, and many hundreds are employed in the ore mines of the company in the lake region.

On the death of Mr. Jones, B. F. Jones, Jr., was chosen chairman of the Board of Directors of the company.

The site of the city offices of the Jones & Laughlin Steel Company, at Third avenue and Try street, is directly over the old Pittsburgh and Philadelphia canal.

Fig. 9.—First Loading.

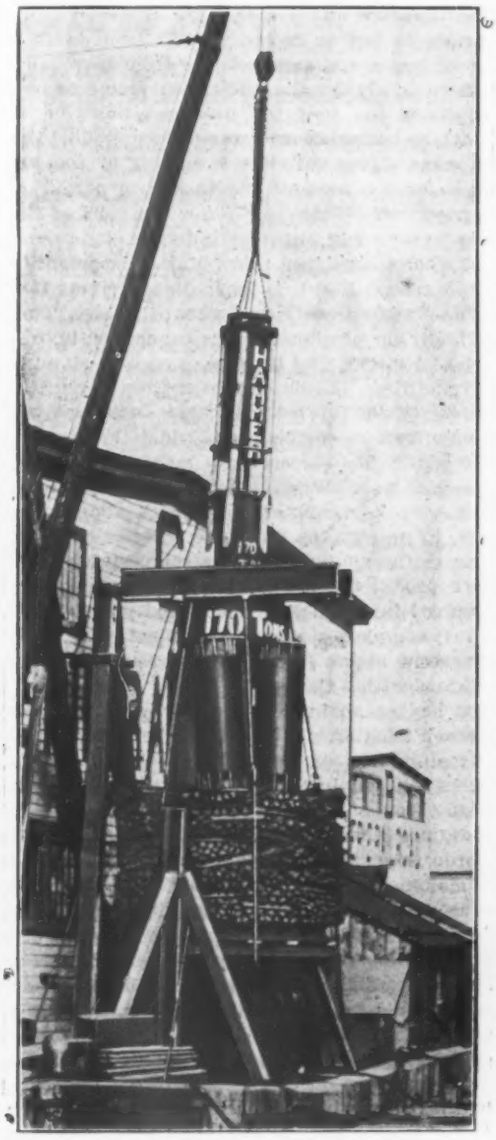


Fig. 10.—Load of 170 tons.

MACHINE FOR SINKING SCREW PILES.

In installing an electric railway system for the city of London the question of conduits is one of those coming up for solution. The type of conduit adopted differs from those in use in New York and on the Continent of Europe. The center slot is used, as in New York, but the service rails are not supported on the yokes. The American construction has greater transverse strength, but this is necessary in this country, on account of the great fluctuations and the extreme range in temperature, and the resultant effect on the pressure of the pavement.

Preventing Pipes and Blow Holes in Ingots and Castings.

BY DR. F. C. WEBER, CHICAGO.

In *Stahl und Eisen* of August 15, 1903, appeared an article on the "Prevention of Blow Holes and Pipes in Ingots and Castings," which was commented on in an article by J. B. Nau, which appeared in *The Iron Age* of September 10, 1903. The writer has done considerable work on this subject, of which the following paper is a partial description, as well as a comment on the work described in *Stahl und Eisen*. This it seems now to be appropriate to put on record in *The Iron Age*. In the making of ingots and castings free from blow holes and pipes there is always the additional factor to be taken into consideration that the produced ingot or casting shall have as homogeneous a texture as possible throughout its mass. This calls for a making of the ingot or casting in such a manner and in such a period of time that segregation will have only the minimum of time for exerting its seriously injurious influence. It is never possible to wholly eliminate this factor of segregation, for the simple reason that it is impossible to freeze the ingot or casting simultaneously throughout its mass. The work which the writer has done in this connection is to fix the nitrogen as a nitride and the free oxygen as alumina, and at the same time, in one operation these impurities are eliminated. To do this metallic borides are employed with titanium alloys in combination, which borides and alloys the writer has succeeded in making successfully in a commercial way. When using one of the metallic borides alone, or in combination with an alloy containing titanium, to prevent the formation of blow holes by adding them to the molten iron or steel, certain definite results are produced. First, the added boride and alloy are dissolved in the molten metal, and when dissolved a somewhat complex series of chemical reactions take place, nascent atoms forming as a result of double decompositions within the molten metal. The nascent atom of boron having an intensely strong affinity for oxygen forms boron trioxide, not only with the free oxygen present in molten iron or steel, but also from such oxides present in solution in the molten metal as are reducible by boron. Iron and manganese oxides are so reducible, and these are always present in molten iron and steel. This boron trioxide forms borates with the other oxides in the molten metal which are not reducible by boron. These are alumina, magnesia and lime, which are invariably present in small amounts in all iron or steel. These borates so formed, being insoluble in the molten metal and being lighter, rise up through the mass or body of the molten metal and float on the surface as a thin film, protecting the surface from oxidation and from nitrogen absorption until the metal freezes. But the beneficial chemical action of the boron does not stop here. The borates flux with the entire series of silicates present in the molten iron or steel, and by so fluxing carry them along to the surface to form the film of slag. This is done because boron, as an oxide, forms borates with the acidic oxide silica as well as with the basic oxides magnesia, alumina and lime. This series of chemical reactions cleanses the molten metal of free oxygen, oxides and silicates, and thereby produces a metal of a very homogeneous texture.

The titanium, introduced as an alloy or as an iron "boron" titanium compound, at once combines with the gaseous nitrogen present in the molten metal forming a stable nitride. It is the formation of this stable nitride which prevents the formation of blow holes and thereby produces solid ingots or castings. The pipe is very much smaller and flat, not an inverted cone, because the metal being freed from free oxides and slags is more liquid, not pasty, which greater liquidity permits a more perfect subsidence in the mold or flask during the cooling down to the freezing point of the metal. This greater liquidity also makes the sharp castings so much desired for all small iron articles.

All of these details are proven facts. They are the result of actual work done in the laboratory, the foundry and the steel mill, complete records of which are extant for reference.

We have here an entire series of improvements in the quality of the products by simply throwing a few pounds per ton of these boron and titanium compounds and alloys into the pouring ladle or the bull ladle, and allowing these materials to do the work. Taking a purified metal, open hearth steel for instance, made by the above described simple method, and using this metal to produce the various alloy steels, the resulting product is a better one simply because the modifying additions of metals, such as chromium, nickel, tungsten, &c., are not masked and altered by the presence of the now always present impurities. In these two elements, boron and titanium, are combined the qualities for preventing, in a great measure, the segregation; and so making homogeneous metal, eliminating the gases oxygen and nitrogen, thereby preventing pipes and blow holes, ridding the metal of residual slags and oxides, and so purifying it that it can be directly converted into any desired special steel or metal in one operation and at once ready for further work. Adding and incorporating these various modifying metals and alloys can be readily effected, by causing them to flow in the melted state into the pouring or bull ladle directly after the boron and titanium have acted, which action being complete inside of two minutes the metal is still thinly liquid and fully capable of alloying with the added metal or alloy before the metal freezes.

When using boron compounds and titanium alloys in combination they must be used in such proportion that chemical reaction can take place as nearly as possible by atomic proportions. The writer has found that by using from ½ to 1 pound of ferro-titanium-boron, and from 2 to 5 pounds of a 20 per cent. ferro-titanium alloy per ton, he gets nearly correct proportions with the several metals with which he has experimented. This method of using boron and titanium in combination is a more perfect method for preventing blow holes and pipes than when employing a mixture of metallic aluminum and an oxide of titanium in atomic or any other proportion by plunging them or it into the mass of molten metal.

When employing the mixture of aluminum and titanium oxide the reactions which obtain are about as follows: A portion of the aluminum alloys with the mass of the molten metal, another portion of the aluminum forms alumina, with the free oxygen of the molten metal, and the oxides reducible by aluminum, all of which alumina and all nonreduced oxides mix with and contaminate the metal. The remaining portion of the metallic aluminum reduces a portion of the titanium oxide; the unreduced portion of the titanium oxide mixes with the metal. The bubbling produced by immersing the mixture is due to and produced by the moisture present in the mixture employed. The titanium liberated from the titanium oxide used being nascent fixes the nitrogen as a nitride. Segregation is affected only in so far as there is more material present to separate while the molten metal is cooling and freezing. The latent heat of stability of aluminum is greater than that of boron, which is proved by the fact that aluminum will reduce boron trioxide, and so there is apparently a point in favor of employing the aluminum in preference to boron. This is not correct, however, in practice, for boron has an affinity for oxygen strong enough to fully extract and combine with all of the free oxygen of the molten metal and reduce a portion of the dissolved oxides, and then fluxing all the others along with all the contained silicates, which two last functions the aluminum cannot perform. Neither can the aluminum form a thinly liquid slag which rises up through the mass of the molten metal and thereby becoming removable. The latent heat of stability of all permanent bodies, whether solid, liquid of gaseous, is that amount of heat which is integrally present and essential to the given body maintaining its molecular entity as such body. This amount of heat may be considered to be such an arrangement of the atoms that by their changing their relative positions they may produce such an oscillation of the atoms as to furnish a definite and distinct amount of sensible heat. Since this chemic-

physical law operates in all these chemical reactions, and always in such a way that the new compounds formed have a lower latent heat of stability, there is sufficient sensible heat produced to maintain the mass of the molten metal liquid sufficiently longer than without the changes taking place to permit of a very perfect separation of the borate slag formed by its rising to the surface. This very effective and simple cleansing of molten iron or steel from their contained impurities as described above makes a gray cast iron of a quality very near to that of soft steel. It makes a Bessemer steel of a quality nearly equal to open hearth, and makes open hearth almost equal to crucible steel, while crucible steel is itself improved in every way. The tensile strength of wire and wire rods can easily be doubled by adding from ¾ to 1 per cent. of titanium additional per ton to what is required for fixing the nitrogen. The ductility of hot sheet steel is increased wonderfully by adding a fraction of 1 per cent. of vanadium, and this is not at the expense of its tensile strength either, which is itself improved by the addition.

Self hardening tool steels are readily made by adding molybdenum or tungsten. Manganese steel from this cleansed open hearth steel and carbonless manganese is as superior to the present Hadfield manganese steel as an open hearth steel is superior to Bessemer steel. These alloyed steels are all made from metallic borides having these various metals as a component. They can be made by simply melting their carbonless alloys and allowing them to flow into the cleansed metal.

Wages and the Export Trade.

C. W. Wellman, general manager of the Wellman-Seaver-Morgan Engineering Company, Cleveland, Ohio, whose work is in almost every great manufactory in the world, whose equipment covers cranes, charging machines, charging cars and boxes, gas producers, valves and open hearth and other furnaces, is reported as having made the following strong statement in an interview on the labor question:

If the manufacturers, the exporters, of the United States want to keep what foreign trade they have, and, further, to increase our exports, they must solve the labor problem, and that without delay.

Germany is the one nation with which the United States really competes for foreign trade; or, rather, it is the one nation which this country must either supersede or leave it master of the situation. Let present conditions continue five years and the foreign trade of this country will practically have become a memory.

The so-called American invasion is not what is worrying England or any other European country. It is the German invasion now. The American design is more popular abroad than ever before, and the demand is met—largely by Germany. Every American design not absolutely protected which gains the least popularity is promptly taken up by the German manufacturer, who, if anything, turns out better work than the American shop. This product—the American design, mind you—is put on the European market, stamped "made in Germany," and sold at less than the cost price in the United States.

Six years ago the American manufacturer could compete with Germany. To-day it is out of the question. Wages paid have doubled in that time. At the beginning, with reigning wages, the American manufacturer could compete with Germany with ease, and Germany forced a practical elimination from foreign markets.

At this time organized labor began to force wages up until a point has been reached where Germany has, with ample reason, lost all fear of the United States as a competitor, and no longer sees a single obstacle in the way of her becoming the commercial sovereign of the world. The American daily wage is $3; the German, 90 cents.

Before the United States can hope to regain her prestige as a power in foreign trade, wages in this country must be reduced 40 per cent. Then, and only then, will we be in a position to compete with Germany. We need stand in fear of no other European nation.

So far as we are personally concerned we pay high wages. We work largely along special lines, and therefore do not meet the competition which confronts the average manufacturer. Abroad a concern in our line makes only one thing. In consequence it cannot be utilized, as our works are, for different purposes. Thus, even with the wages we pay, we can still underbid Germany. Ours is the exception that proves the rule which applies to the other manufacturers. Our shops are open. We tolerate no dictation. In the interest of foreign trade we will welcome a movement for the reduction of wages.

The New York Car Wheel Company.

An interesting condition has developed in the affairs of the bankrupt New York Car Wheel Company. After more than two years of negotiating the property has nearly been sold to Joseph H. Berry of Detroit, Mich., president of the Manistique Iron Company; but at this time it cannot be told whether the sale will be concluded. A number of bidders appeared in the bankruptcy court in Buffalo on November 6, at the time set for the adjourned auction sale of the property. Mr. Berry had made the highest bid for the property. Samuel Joseph of New York was the next highest bidder, and when he made his bid intimated that he might be willing to give $25,000 more if he had time to look it over. The referee gave him until 2.30 p.m. Friday, when he asked for more time. Some of the creditors were in favor of a postponement of the sale, even though Mr. Joseph was not willing to hold his bid open and despite the fact that Mr. Berry's representative said that he would withdraw the Berry bid if there was an adjournment. A brief recess was taken, and when the court convened again Receiver Becker suggested that the property should be sold to Mr. Berry, but that the referee should not sanction the sale before Wednesday of this week. In the interval prospective bidders will have ample opportunity to examine the property, and if any are prepared to bid more than $152,000, the amount of Mr. Berry's bid, the sale to him will not be confirmed by the referee.

A revised report of the appraiser shows the assets to be: Machinery and tools, $122,158; general merchandise, $5637; new wheels, $9220; street car wheels, $8378; fixtures, $1596; wheels in bond, $3170; land and buildings, $139,950; New York plant, $6241; cash on hand, $876; stocks and bonds, $97,000; total, $394,226. This appraised value is on the property for sale. It is said that the stocks and bonds, appraised at $97,000, are of small value.

Important Niagara Falls Suits.—The National Contracting Company have brought an action against the Niagara Falls Power Company, Niagara Falls, N. Y., to recover $400,000, claimed to be due on the contract for building the Power Company's wheel pit No. 2 and the extension of the main tunnel to that pit. The Power Company deny the claim, and make counter claims for damages amounting to $600,000, caused by the alleged delays of the Contracting Company, which compelled the Power Company to put the Contracting Company off and complete the work themselves, and for many months prevented, it is said, the Power Company from supplying additional power to their customers from the new power house. The Contracting Company have also brought suit against the Niagara Junction Railway, involving a claim of $28,000, arising out of the same contract, and the Railway Company deny any liability on this claim. Both actions were originally brought in New York County, but were transferred to Niagara County for trial on the application of the defendants.

An experiment was recently tried in Switzerland to determine that there were different degrees of temperature in steam boilers, and a Scotch boiler was used in the trial. It was found that the upper part of the boiler was 159 degrees Celsius hotter than the lower part, and that after two hours there was very slight change in the temperatures. This experiment would have been more satisfactory if several types of boilers had been tested, for the peculiarity noted in the case of the Scotch boiler has been known for a long time, and it is one of the chief objections to its use as a generator.

A National Association of Building Contractors.

A call for a convention to be held in Chicago, Thursday, December 10, for the purpose of forming a national association of building contractors has been issued by the Building Contractors' Council of Chicago, Master Builders' Association of Pittsburgh, Contractors' Association of Cincinnati, Builders' Exchange of Reading, Pa., Building Trades Employers' Association of New York City, Builders' and Traders' Exchange of Minneapolis and the Building Contractors' Council of St. Louis. Previous to the issuance of this call favorable replies on the forming of a national association were received from contractors' associations in San Francisco, Denver, Topeka, Omaha, Kansas City, Cedar Rapids, East St. Louis, Louisville, Toledo, Cleveland, Detroit, Jackson and Baltimore, as well as from National Association of Plumbers and the Massachusetts State Association of Master Builders. The call was issued to 460 associations throughout the country.

E. M. Craig, secretary of the Builders' and Contractors' Council of Chicago is the prime mover in this attempt to unify the employing forces in building operations throughout the country. Accompanying the call is a letter stating the reforms which such a national association should seek to accomplish, as follows:

"The present depression of the building industry, now almost universally felt throughout the entire country, is in a measure due primarily to the unusual activity of organized labor in all branches of industry; while more or less general in the building line, the attitude of organized labor in our manufacturing industries has had a depressing effect upon the building public, causing many building operations to be either deferred or abandoned, in the fear that the unrest in other labor circles might extend to the building employees. These facts, together with the scarcity of and high prices for some materials has had a tendency to curtail building operations. Some remedy for this condition of affairs must be devised, and we believe that the task of developing this remedy devolves upon the contractors of this country. Proper steps should at once to be taken to inspire the confidence of the building public, and insure to them the continuation of work and uninterrupted completion of their buildings.

"We believe that only through the medium of a strong National Association can this be accomplished. The fact alone of having a national association will at once have a salutary effect upon any body of men before any attempt is made to disturb industrial conditions in the building line in any part of the country.

"We believe that the objects of the organization should be:

"1. To advance and protect the interests of the contractor.

"2. To secure equitable treatment in their dealings with their employees.

"3. To encourage organization and the formation of associations of contractors.

"4. To regulate conditions among building contractors.

"5. To devise means for the better advancement of the interest of the contractor.

"We believe that the policy of the organization respecting its attitude toward organized labor should be:

"*a.* To maintain peace and harmony between the employer and the employee.

"*b.* That the basis of the settlement of all disputes should be conciliation and arbitration.

"*c.* That where conditions are proper and employees' associations exist agreements be made with them.

"*d.* That a uniform agreement be adopted and used in making joint agreements.

"That all agreements embody the following principles:

"1. That there shall be no limitation as to the amount of work a man shall perform during his working day.

"2. That there shall be no restriction of the use of machinery or tools.

"3. That there shall be no restriction of the use of any manufactured material.

"4. That no person shall have the right to interfere with the workman during working hours.

"5. That the use of apprentices shall not be prohibited.

"6. That the foreman shall be the agent of the employer.

"7. That all workmen are at liberty to work for whomsoever they see fit.

"8. That all employers are at liberty to employ and discharge whomsoever they see fit."

It is the purpose of the founders of this association to form an organization that shall be national in its scope, embracing every town and city in every State, and embracing in its membership all existing associations whose members are engaged in the erection of buildings, with central organizations in the leading cities.

When Mr. Craig was asked why it would not be feasible for the contractors to join hands with the newly formed Industrial Association of America he took the stand that the Chicago body had decided by vote to await the issue of the Indianapolis convention before making definite decision on this point. The stumbling block in the way of the Industrial Association, as outlined by the Chicago contractors, is that because of its policy to admit the individual workman the associations and the various citizens' alliances might easily become the prey of a concerted movement on the part of thousands of workmen who might join the association for the purpose of outvoting and overruling the employing classes. Mr. Craig said: "If I were an unprincipled labor leader or politician I would make it a point to crowd the membership of all the citizens' alliances and similar bodies with my henchmen, and in that way would soon have control of a very powerful organization."

The Royal Commission appointed to inquire into the possibility of developing the iron industry in Australia has completed its labors. By the casting vote of the chairman it was decided to recommend the bonuses originally suggested by the Government—viz.: Class 1. Pig iron made from Australian ore, 12 shillings per ton; puddled bar iron made from Australian pig iron, 12 shillings per ton; steel made from Australian pig iron, 12 shillings per ton; bonus amounting to £250,000. Class 2. Spelter made from Australian ore, for the first 10,000 tons, £2 per ton (£20,000). Class 3. Galvanized iron, 10 per cent. on value; wire netting, 10 per cent. on value. Iron and steel tubes or pipes (except riveted or cast) not more than 6 inches internal diameter, 10 per cent. on value; bonuses amounting to £50,000. Class 4. Reapers and binders, the first 500, £8 each, amounting to £4000. The official pronouncements of the Commission are not yet available, and the bonus question will have to come before the House again. The weight of evidence throughout the inquiry has been strongly in favor of State aided private enterprise as against State ownership and control. It was expected that the labor party would fight strongly for the latter, but they are scarcely likely to attempt it now, in face of the evidence collected by the Commission.

The Illinois Manufacturers' Association was represented at the State Legislature last week by a lobby of 50 members, whose purpose was to protest against the law taxing capital stock of Illinois corporations. They claim that such a tax involves a double taxation, and puts incorporated companies under a disadvantage as compared with copartnerships. Their plea was coupled with the threat that if an attempt was made to enforce the law they would change their incorporation to some other State.

Recent decisions of the courts in England, which mulcted trades unions in large sums for disobeying the laws of the land, have dismayed the members and leaders alike of such combinations against trade, and in a congress of them at Leicester lately a bill was formulated to petition Parliament to grant total immunity to the funds of trades unions from fines or assessments by reason of their defiances of law and order. That is to say, they claim the right to dance, but do not wish to pay the fiddler.

Jig for Milling Feed Clutches.

A jig which is reported to be giving very efficient service, and which is of interest as an important means of reducing costs of production, is in use by the Bickford Drill & Tool Company, Cincinnati, Ohio, for milling the feed clutches of their radial drilling machines. The clutches are of the regular saw tooth or spiral jaw type,

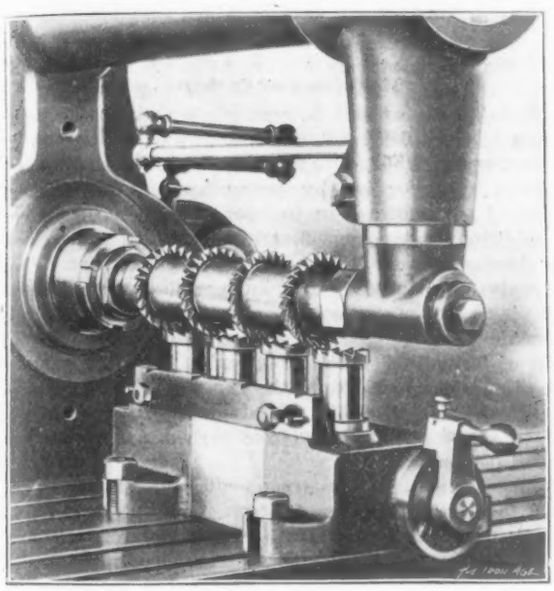


Fig. 1.—Milling Feed Clutches.

addition to the saving thus effected, there is a considerable gain due to convenience of setting and indexing. The result is that the time consumed on a lot of clutches is now only about one-fifth of that required by the old method.

The construction of the jig, as shown by Fig. 2, is quite simple. The pieces to be milled are slipped onto vertical expanding mandrels, and there securely fastened by means of a socket wrench engaging the expanding screws inside the mandrels. The lower end of each mandrel, within the base of the jig, is fitted with a worm wheel, each worm wheel meshing with a worm extending the entire length of the jig, and actuated by means of the crank plainly shown in Fig. 1. This crank, in connection with a suitably divided index plate, may be made to turn the worm through as many rotations or fractions thereof as may be necessary to give the desired tooth spacing to the clutches, all four of which are rotated at once. The cutters are set by means of notches in tool steel gauges, which may be bolted to the side face of the jig, as shown in Fig. 2. Fig. 1 shows the jig without the gauge and with four clutch halves finished ready for removal.

While the appliance was originated for this particular piece of work, it is useful on other jobs of a similar nature, and is often employed in this way. Different hub lengths of clutches or other pieces of work are accommodated by the use of various hights of expanding bushings and screws forming the upper portion of the mandrels.

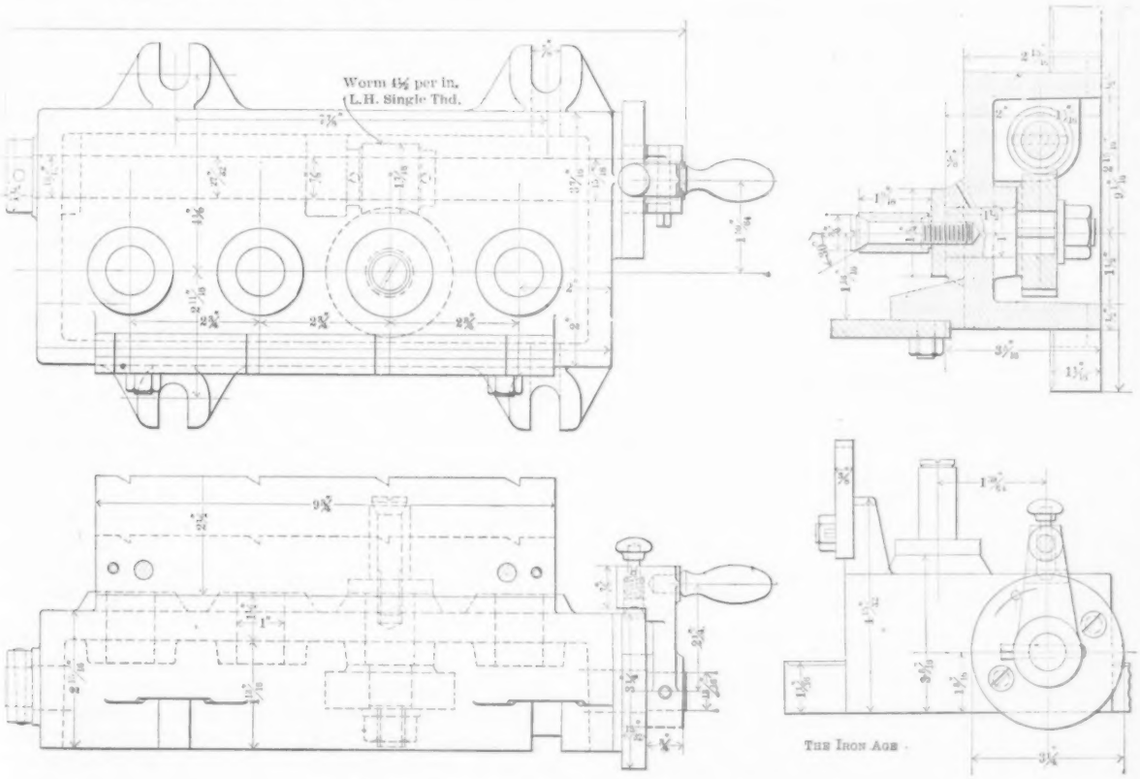


Fig. 2.—Construction of Bickford Feed Clutch Milling Jig.

JIG FOR MILLING FEED CLUTCHES.

The original method of milling which was to place one half or member of a clutch upon the index center of a milling machine and, after adjusting it properly, mill the teeth with a suitable cutter. This method required individual setting and indexing of each piece, in addition to the fact that only one piece could be operated upon at a time. To reduce the time cost of this operation the jig shown in the accompanying illustration was designed and constructed. As will be noted from Fig. 1, four clutch halves may now be milled simultaneously. In

The J. L. Perkins Company, Chicago, Ill., wholesale dealers in tin and other metals, have made an assignment, with liabilities of about $210,000. The failure is said to have been caused by the unwillingness of the banks to advance money on goods that were stored in the company's private warehouses.

The Lunkenheimer Company, Cincinnati, Ohio, have opened a branch office in Paris, France, located at 24 Boulevard Voltaire, where they carry a complete stock of superior brass and iron steam specialties and engineering appliances.

A Brief Study of the Ferro Metals and Their Electrical Manufacture.

BY AUGUSTE J. ROSSI, NEW YORK.

We intend in the following to describe in a succinct manner the methods followed in the manufacture of ferro metals in general, mentioning their properties and uses, but specially to submit the result of four years of study of the last comer, ferro-titanium, not so well known in this country as it appears to be in Europe.

Of these ferro alloys some have been known for many years; others have been introduced into use at a more recent date; others still are quite new, either on account of the scarcity of the ores from which they are obtained or because of special difficulties or cost of reduction, only surmounted lately. The development of electrical science within the last 20 years has been such that even certain of these ferros, formerly manufactured in the blast furnace, have been smelted by electrical processes, and this method has proved to be more economical than the one previously followed, so that they really come within the scope of this article.

Ferro-Manganese.

Spiegel and ferro-manganese and their use in the steel industries have been too well known for years to deserve more than a mention. Their manufacture has been and is yet carried on regularly in the blast furnace with perfect success. However, certain manganese ores, known under the generic name of "wad," and found in Canada and elsewhere, covering large tracts of land, occur in a physical state which has rendered their treatment in the blast furnace unprofitable. We have this year smelted electrically this class of ores by a special electric method. They yielded an excellent ferro, and such smelting, if properly carried on, will certainly prove economical whenever and wherever such ores can be obtained at a nominal cost, practically that of digging them, and where the electric current is available at favorable figures.

Ferro-manganese, or spiegel, used in the steel industry for recarburizing, introduces into the finished product but a small percentage of manganese—say, from 0.20 to 1 per cent., more or less. Special steels containing as much as 12 to 14 per cent. of manganese, known as "manganese steels," have more lately received industrial applications. The work of Mr. Hadfield in this line is classic, so to speak, and we cannot do better than to refer the reader to the masterly papers he or others have published on this subject.

Ferro-Silicon.

There is another ferro which has been known for years, and which also can be manufactured in the blast furnace, at least up to percentages of silicon of 12 to 14 per cent. or thereabouts, but above these figures the electric smelting of ferro-silicon up to 50 per cent. or more of silicon has proved more economical—in fact, it is the only method which could insure success. The uses of this ferro in the metallurgy of iron are too well known for us to insist upon them. It has received also other applications.

Ferro-Nickel.

This is another ferro of which the use in the manufacture of steel has stood the test of years' experience for armor plates, boiler plates and kindred or other purposes, but the metal itself can be readily obtained now from its ores by metallurgical treatment other than electrical, and as nickel is most generally introduced in the steel as a metal it does not properly come within our province to do more than mention it. We should add that so far as nickel or any other metal is concerned and mentioned as electrically obtained, it is not the intention to consider electrolysis. If advisable and economical, however, under special conditions ferro-nickel could also be smelted electrically.

Other Ferros.

The ferros to be referred to specially are the alloys of iron with metals whose occurrence in nature is rarer. Such are ferro-chrome, ferro-tungsten, ferro-molybdenum, ferro-vanadium, and particularly ferro-titanium. Although the ores of the latter are abundant and cheap, it is but little known.

The rarer metals are met in nature most frequently in the state of oxides associated with oxides of iron, in an earthy gangue. Very often these ores, being too poor, must be concentrated so as to eliminate as much as possible the nonmetallic elements. These concentrates, unless the ores themselves prove to be rich enough, form the real raw materials of the manufacture of ferros. Titanium occurs in many iron ores as titanic oxide, frequently to the extent of 10 to 40 per cent. and more, and is also met in nature as rutile, which contains 85 to 95 per cent. of titanic acid, the balance being chiefly oxide of iron.

Reduction of Carbon.

Metallic oxides may be reduced to their metallic elements by two different methods. First, by carbon in some form, in which case the ferro obtained contains always a lesser or greater percentage of this element (above 1 per cent. and up to 8 per cent. or more). Even an additional subsequent electrical treatment of the product does not remove it below 2 per cent., if to that. They may also be reduced by aluminum, whose property as a reducing agent of oxide compounds has been known as a laboratory fact for the last 50 years or more. The great heat of formation of aluminum oxide (alumina) causes the aluminum to oxidize at the expense of the oxygen of the compound. By this second method the ferros obtained are practically free from carbon, containing less than 1 per cent.

The first method (by carbon) can be carried on in the blast furnace. This is true for ferro-manganese and ferro-silicon, as we have seen. It is even so for ferro-chrome, which has been made in the blast furnace, up to 60 per cent. chromium, at Unieux (France); but the oxides of tungsten, vanadium, molybdenum, and especially titanium, are not reduced to any practical extent at the temperatures prevailing in the blast furnace, though their reduction is readily secured in the electric furnace.

The creation of large electric power plants, or of more modest plants in favored localities, has rendered electric current available at reasonable and even advantageous rates, and this electrical treatment is perfectly practical and industrially economical. It is more particularly so for such ferros as ferro-silicon (above certain percentages of silicon), ferro-manganese under special conditions as to ores, and for ferro-chrome, than is the blast furnace smelting.

First Method—Reduction by Carbon.

Electric furnaces vary considerably in their details of construction, and also in the mode of application of the current, but one of the dispositions frequently adopted as the most practical—certainly the simplest—is the following: The electric furnace consists essentially of a masonry of graphite, agglomerated with and incased in an iron or cast iron shell or box connected at the bottom with one of the bus bars of the current, and forming the anode. In this masonry there is a central cavity forming a crucible or hearth, the dimensions of which are determined by the quantity of material to be heated in one charge, the quantity being dependent upon the intensity of the current available. A pencil of carbon or a bunch of several pencils, as the case may be, of an area determined by the amperage used, forms the cathode or positive electrode. This carbon is counterbalanced by proper weights, and is so supported that it can be moved vertically up and down in the center of the cavity or hearth, leaving ample room between the sides of the hearth and this electrode. This motion is obtained either by hand, with proper pulleys, chains and winch, or automatically by appropriate electrical devices. This carbon pencil is connected by proper contrivances, such as flexible cables, with the other bus bar of the current. A lowering or raising of the carbon pencil causes the arc to start between the charges as they are gradually fed around it in the hearth and the bottom of the furnace forming the anode. Generally the arc is started first between the pencil of carbon, the cathode and the anode (the bottom of the hearth), and the materials are gradually charged until the furnace is about half full. The operation of reduction proceeds and fresh charges are added at proper intervals, according to current and the composition of the ores. The time of casting will, of

course, vary. When enough ferro alloy has been obtained the furnace is tapped at a proper opening, provided at the bottom of the hearth, and the charging is resumed gradually at regular intervals until the next cast. The charges consist of an intimate mixture of the concentates or of rich ores and of carbon in some form (charcoal, coke, anthracite), both materials being in the state of coarse powder. The arrangement of the furnace is that of the typical Siemens electric furnace of 1879. Many patents have been secured for different arrangements of the electrodes and of the other parts of the apparatus, but as an arc furnace this Siemens disposition appears to be the simplest and the most effective. The current used can be continuous or alternate. The furnace may be round or square. It may be closed at the top with special devices, such as plates, cooled by a circulation of water. The pencils of carbon forming the cathode may also be provided with a head in which circulates water. The feeding, when the furnace is closed at the top, may be performed automatically with a worm and gear. The main features, however, remain the same and the various improvements adopted aim to avoid as much as possible any loss of the heat supplied by the current or its utilization after it has secured the desired reduction of the oxides, and to reduce to a minimum the wear and tear of the electrodes or of the furnace itself, and thus diminish the cost of production.

In this manner we have made or seen made ferro-chrome, with 65 per cent. chromium or more; ferro-silicon, with 45 to 50 per cent. silicon; ferro-molybdenum, from molybdenite (a sulphide of molybdenum with more or less iron. In this latter case the sulphur was removed from the compound of carbon instead of the oxygen); ferro-tungsten, with 76 to 78 per cent. tungsten, and ferro-titanium, with from 4 to 75 per cent. titanium or more.

All these ferros contained from 3 to 8 per cent. of carbon, excepting ferro-silicon, since carbon appears to be excluded from the alloy by silicon. These carbon alloys are not, as a rule, so well adapted to the treatment of steel as others practically free from carbon. Their cost depends greatly on the price paid for the concentrates or the ores. While good chrome ore costs only $25 per ton, wolfram concentrates (oxide of iron and tungsten with 65 to 70 per cent. of tungstic acid) cost as much as 8 cents per pound, while vanadic concentrates and molybdenite are rated at least at 50 cents and 45 cents per pound. As regards ferro-titanium for seasoning cast iron by the addition of 1 to 2 per cent. of a 10 per cent. alloy, the presence of carbon in the ferro is of no consequence, and therefore, since it may be reduced by carbon, its cost is considerably lower than that of the other carbon ferros mentioned, excepting possibly ferro-silicon. Titaniferous iron ores of a composition capable of yielding ferro-titanium containing from 10 to 35 or 40 per cent. of titanium do not cost any more than ordinary iron ores, and even less. We may add that on this score of cheapness of raw materials ferro-titanium proves the cheapest to manufacture of all the ferros mentioned above.

These titaniferous ores are found nearly all over the world—in some localities in the Adirondacks, New York, and other States of the Union; in Norway, Sweden, Russia and Canada, in mountain masses. They are most generally free from injurious amounts of phosphorus and sulphur (below the Bessemer limit). Titanic oxide, or titanic acid, as it is also called, is met also in nature as rutile, containing from 85 to 95 per cent. titanic acid and more. Recently it has been found disseminated through a rock formation in Virginia, permeating the rock to the extent of giving it a purplish color. A water concentration will readily yield the rutile as high as 90 per cent. in titanic acid, and more, the balance being mostly iron oxide. In the event of a proper demand it could be supplied, it is said, at very reasonable rates. Of course rutile can be reduced by carbon directly by the method described above, but for reasons that are to be referred to further the much cheaper titaniferous iron ores are preferred—at least for alloys in which the presence of carbon is not objectionable.

At any rate, were the price of rutile to prove an item of importance when ferro-titanium free from carbon is desired, and were titaniferous iron ores to be too low in titanium for very high percentage of titanium desired in the ferro, above 40 per cent. titanium, for instance, then an "artificial" rutile, an igneous concentrate of titanic acid, can be made by a special method. Applied, for instance, to an iron ore containing, like the Adirondack ore, 58 to 60 per cent. of iron (metallic), 15 per cent. of titanic acid and some 3 to 5 per cent. of gangue, the method consists, briefly, in reducing electrically only the oxide of iron of the ore by adding carbon in quantity just sufficient to do so but no more, and applying a moderately intense current. Pig iron is obtained, and the slag accompanying it contains practically all the titanic acid of the ore with no or but very little oxide of iron. As much as 70 per cent. of titanic acid, and even 80 per cent. and more (using other ores), has thus been found in this "igneous concentrate," as we have called it; it is, in fact, an "artificial rutile."

The pig iron produced has the special qualities of the metal obtained in the blast furnace from the smelting of titaniferous iron ores, and, as such, it commands a price which offsets the expense of the concentration, so that it is possible to secure at a nominal or no cost the raw material "rutile," with which alloys of any percentage of titanium can be made by the carbon method, or which can be advantageously used for reduction by the aluminum method. This igneous method of concentration could be and has been applied by us, in certain cases, to obtain very high concentrates of metallic oxides, other than titanic oxide, when associated with an oxide of iron.

Reduction by Aluminum.

In the reduction of metallic oxides by the carbon method the amount of the reducing agent, the carbon, is of little consequence from the point of view of cost, but when the metallic oxides are reduced by aluminum any oxide of iron associated with the oxides of the other metal or metals to be reduced in the ferro requires a certain amount of the much more expensive reducing agent, the aluminum.

In this method the aluminum can be used in two different physical states, in powder or very finely comminuted—that is, Dr. Goldschmidt's method—or as a bath, which is the method we have introduced.

Aluminum in powder has been known for the last 50 years or so as a powerful reducer of metallic oxides. The powdered aluminum was mixed intimately with the powdered oxide to be reduced and the mixture heated in a crucible, but these experiments were mere scientific or laboratory curiosities, the reaction being immediate, and, under these conditions, violent to the extent of projecting the incandescent mass out of the crucible, proving actually dangerous if operating on more than insignificant quantities of materials. It was due to Dr. Goldschmidt to make an industrial application of this experiment. Instead of heating directly the mixture charged in a proper vessel, he does it indirectly by using a primer made of a mixture of powdered aluminum and of an oxide which yields its oxygen easily, placing this primer in the mass to be reduced, and starting it by means of a ribbon of magnesium or in any other appropriate manner. In this way the reaction, though requiring but a very few minutes (two or three), proceeds by contiguity of contact, and without the intervention of any external heat, the oxidation of aluminum to alumina at the expense of the oxygen proceeding exothermally, once started at one point of the mass.

Without entering into a discussion of the value of the method as applied to the manufacture of ferro metals, we may be allowed to say that, owing to the very rapidity of the reaction, when operating on large masses there is some danger, unless a perfect and absolutely intimate mixture of the powders of aluminum and oxides, difficult to realize, be secured, that some parts of the mass may escape reduction and that aluminum may be found in the ferro to an objectionable extent. This has been the case at least in two ferros obtained by this method, and imported from Europe. They contained, respectively, 6 and 10 per cent. of aluminum, according to analyses made by reputable chemists. The operation can be made,

to a certain extent, continuous, by using a certain amount of primer to keep the mass of metal in a molten state, but obviously a large daily production involves at least delicate manipulations and special experience and care.

At any rate, admitting the best possible and most favorable conditions and results, the price of aluminum in powder becomes a factor of great importance.

Aluminum in powder in Europe costs about 1.75 times the price of aluminum in ingots, and here in the United States more than double, 70 cents, as against 30 cents, and that by the ton. For this reason alone the use of aluminum in ingot, instead of in powder, must necessarily reduce considerably the expense of manufacture, as the aluminum enters in the final cost for at least one-half to three-quarters of the latter. The method that we have introduced, and by which tons of ferros can be made, is also simpler of application and manipulation and necessarily cheaper on this account also.

The operation was carried on in an electric furnace like the one described above. The sides of the central cavity were preferably lined with magnesia bricks or other refractory materials, which have the double advantage of being bad conductors of heat and of preventing the contamination of the alloy by contact with the carbon of the hearth (on the sides at least). The furnace was charged with aluminum (scrap, ingots or the like), in proper proportion to secure the complete reduction of the metallic oxides (chromic, tungstic and vanadic, molybdic, titanic oxides, &c., associated with more or less oxides of iron). The aluminum melted immediately. Into this bath we shoveled the concentrates (or the oxides themselves, if rich enough in that condition), coarsely granulated, or in moderately fine grains. The reaction sets in immediately, the oxides of iron reduced first forming a bath of iron in which the other metal, reduced from its oxide by the molten aluminum, dissolves. The furnace becomes incandescent, and the current has generally to be moderated, or even stopped for a short time, until the reaction is complete, when it is turned on again in order to keep the ferro obtained in a molten state. After tapping a fresh quantity of materials is charged and the new operation proceeds as before. The labor is reduced to a minimum.

With two men at the furnace we have made in this manner 650 pounds of ferro-tungsten, of 76 per cent. tungsten, with about 11 horse-power, in 30 minutes, counting time of charging and casting. The ferro contained: Aluminum, none; carbon, 0.66 to 0.90 per cent. We have made in the same manner ferro-chrome of 70 per cent. chromium; ferro-titanium, containing from 10 to 75 per cent. titanium, and from 0.25 to 0.75 carbon, with no or but a very small quantity of aluminum.

However, while the ferro is kept melted by the current a fresh addition of a small quantity of oxide of iron or of the concentrates or ores themselves (if rich enough) would remove all objectionable quantities of aluminum if necessary or required.

If we use rutile or its equivalent, our "titanic concentrate," or "artificial rutile," when working for ferro-titanium, for instance, we may add good scrap iron after the aluminum is charged. This forms a bath with the aluminum into which the rutile or the other oxide to be reduced is charged. Thereby we save on the current required for the reduction of the oxide of iron, for which is thus substituted an equivalent quantity of iron, which has only to be melted, although this is not an item of as much importance as the saving of the amount of aluminum otherwise found necessary. This bath of iron is proportioned to the percentage of the other metal aimed at in the ferro. It can easily be understood that by charging into the bath of aluminum a mixture of two or more metallic oxides, containing oxide of iron, a multiple ferro may be obtained, such as chrome-titanium-ferro, tungsten-titanium-ferro, chrome-tungsten-ferro, or the like.

To illustrate the saving on the cost realized by using this bath of aluminum instead of the powder, let us take the actual quotation (by the ton) in New York of the aluminum in ingots of such a quality as we have used in our operations (it is 30 cents per pound), and of the aluminum in powder, which has been quoted to us at 70 cents a pound by the ton and $1 by the pound. In order to reduce 100 pounds of the Canadian chromite concentrates treated (chromite, containing 65.16 per cent. of chrome oxide and 27.36 of iron oxide, and capable of giving theoretically 56 pounds of ferro-chrome of about 70 per cent. chromium) 32 pounds of aluminum are required. Assuming that incidental expenses, cost of ores, labor, &c., are the same in both cases, there is, for aluminum alone, a difference of about 22 to 23 cents per pound of alloy produced. Whatever allowances may be made for losses in both cases, whatever may be the relative price of the two kinds of aluminum, there will result necessarily proportional saving, and we may even add that the manipulations, when dealing with a bath of aluminum, require obviously less labor.

Properties and Uses of the Ferros.

All the ferros are used in a general manner to impart to steel special qualities of hardness, toughness, ductility, strength, &c., and improving the ordinary steel treated. The combined use of two or more of these ferro metals may also, by counteracting in a finished product the influence of the other within certain limits, secure valuable properties for specific industrial applications. We will not enter into a detailed description of the properties and uses of these alloys, referring for further details to the special articles written on the subject, but will limit ourselves to indicating briefly their salient points.

Ferro-Chrome.—Ferro-chrome, free from carbon (less than 1 per cent.), or, in some cases, containing 3 to 8 per cent. carbon, is used more especially in the manufacture of shells and tempered products, tool steels and the like—in general, whenever properties of particular hardness are desired; though it secures them at some sacrifice in the toughness of the metal.

Ferro-Tungsten.—This alloy is very much looked for in the manufacture of tool steel, 9 to 10 per cent. tungsten being found in the finished steel, and of late as much as 25 per cent. tungsten has been or is to be introduced into steel, as we were told. The great weight of tungsten has suggested its use for bullets. Tungsten steel possesses a very peculiar property. When forged red hot and cooled slowly it presents an extraordinary degree of hardness, but if plunged red hot in cold water, contrary to what happens with ordinary carbon steel, this hardness gives way to softness.

Ferro-Molybdenum.—Ferro-molybdenum, used in steel in such quantities as to incorporate in the metal 2 to 3 per cent. of molybdenum, imparts to it the peculiar property of "air tempering," or "self tempering." We have seen 13-inch shells, made of Carpenter steel, planed with such molybdenum steel tools, running dry, and which cut ribbons of steel hot enough to be blue without the tool losing its temper. Under certain conditions of heat treatment and quenching it imparts to steel other valuable properties, hardness being a characteristic.

Ferro-Vanadium.—This alloy appears to communicate to steel properties very much like those secured with nickel, and acts very much also like ferro-titanium. It is a new ferro, not very well known yet. It has been used chiefly experimentally. In the proportion of about 0.50 per cent. in the steel, vanadium is said to increase the elastic limit wonderfully. It is very infusible, and in this respect stands next to ferro-titanium. One of the great drawbacks of its use is the scarcity of its ore, which must be highly concentrated, as it occurs sparingly in some rocks and commands a high price. The very lowest price we have heard quoted for vanadic concentrates is 50 cents per pound.

Ferro-Silicon.—Ferro-silicon, electrically smelted and containing some 25 to 30 per cent. silicon and up to 50 per cent., has been much used of late in the manufacture of steel castings. It secures soundness and freedom from blow holes in the castings. It resists atmospheric influences remarkably well whenever the percentage of silicon reaches 25 per cent. or thereabouts, the effect increasing with the percentage of silicon.

Ferro-Manganese.—Manganese steel containing 6 per cent. manganese or thereabouts loses its magnetic properties, and at 13 to 14 per cent. manganese it is practically nonmagnetic. It possesses a great resistance to

fracture by concussion. The maximum of strength appears to be secured in steel containing some 14 per cent. manganese. Such steels have been used for forgings, car wheels and crushing and grinding machinery. It is toughened by water quenching, but does not temper in the sense in which the word is generally used.

Ferro-Nickel, Nickel.—Its uses for armor plates, boiler plates and structural steel have stood the tests of a prolonged practice. Some 3 to 5 per cent. nickel is generally admitted to be necessary in the finished steel to secure the proper results. As much as 20 to 22 per cent. nickel has been proposed for boiler plates. A 30 per cent. nickel steel is well adapted for service in salt water on account of its resistance to corrosive action. Its recognized action upon steel is to secure a high elastic limit and strength combined with toughness.

As to ferro-titanium it was only mentioned as a laboratory curiosity some four years ago. Its influence on the properties of cast iron and steel has become better known and appreciated within the last two years. As it is a subject on the development of which we have worked for several years, we will give below the results of the numerous tests made by us or others with ferro-titanium of different percentages of titanium, free or with carbon, manufactured by us on an industrial scale by the ton in the case of some of them.

Ferro-Titanium.—It can be manufactured by either of the two methods described, and, according to which is followed, it contains carbon less than 1 per cent. or up to 8 per cent. We have found, and in that we are corroborated by European practice with the ferro-titanium obtained there by Dr. Goldschmidt's aluminum powder method, that as the percentage of titanium increases the alloy becomes less and less fusible. In fact, 10 per cent ferro-titanium does not melt at the melting point of cast iron or steel, though it dissolves in the molten metallic mass, particularly if it is used in a smaller state of division. This is true also to quite an extent for most of the other ferros when high in the metal alloyed with iron. The specific gravity decreases with the percentage of titanium, this metal having a specific gravity of only 4.87 (Moissan). We have found 5.60 as the specific gravity of a ferro-titanium containing 35 per cent. totanium with 7 to 8 per cent. carbon. On account of this infusibility we are of the opinion that, for cast iron treatment, 10 per cent. ferro-titanium should be preferable, and for steel not over 20 to 25 per cent. ferro-titanium.

An article published in *Stahl und Eisen* contains the following, in substance: "The alloys carrying 40 per cent. titanium or more have presented such difficulties for metallic applications, owing to their high melting point, that alloys carrying 20 to 25 per cent. titanium are preferred. Even these should be heated previous to their addition to steel. Very small quantities of titanium, as little even as 0.10 of 1 per cent., give, as is well known, a great density and close grained texture to the steel metal and a remarkable tenacity. . . ." In fact, all our own experiments and those of others have shown that the addition of 1 to 2 per cent. of a 10 per cent. ferro-titanium, or even less in certain cases, will secure the desired effect.

The action of titanium, apart from any specific influence it may have on the finished steel if present in more important quantities, appears to be at least one of purification by removing the gases, such as oxygen and specially nitrogen, contained in the steel. Titanium, as is well known, burns in nitrogen with incandescence at a temperature of about 1500 degrees F. (800 degrees C.). In this manner blow holes may be avoided in the cast metal or ingots very much as ferro-manganese eliminates the oxygen in the Bessemer or open hearth process.

In the article of *Stahl und Eisen*, quoted above in substance, we find indeed this same statement, as follows: "The presence of cyanonitride of titanium in minute red crystals was observed with the microscope in steel treated with titanium." For this reason we have suggested the use of ferro-titanium containing carbon in the converter, both as a recarbonizer and a purifier. In our experiments with steel, made in the crucible, the addition of an alloy free from carbon seems to have imparted to high carbon steel, containing 0.83 to 1.22 per cent. carbon, a remarkable elastic limit, as high as 76,000 pounds per square inch in some tests, and increased the reduction of area and elongation, but particularly the former, to figures met only with much softer steel. In a 0.83 per cent. carbon steel with 0.09 per cent. titanium a reduction of area of 21.90 per cent. was recorded, and with a 1.22 per cent. carbon steed with 0.12 per cent. of titanium as much as 30.90 per cent. reduction of area was observed. The fracture of the steel presented in both cases a fine silky appearance.

Our own experiments with cast iron have been very numerous, and some have been carried on in the cupola, on a large scale, by outside parties, for car wheels. The ferro used in all these cast iron tests was a 10 per cent. ferro-titanium containing about 7 to 8 per cent. carbon, and the tests were made in the crucible, the ladle or the cupola. We may state, generally, that foundry iron thus treated was found to be free from blow holes, the metal was dense, close grained, taking a fine polish, soft to the file, and particularly well adapted, we are told, for steam cylinders, iron pipes, return bends, fittings and kindred uses. Both the transverse and tensile strengths showed considerable increase, varying from 20 per cent. or somewhat below to 30 per cent., according to the quality of the original pig metal treated. In our experiments, when operating in crucibles, we generally treated 100 pounds of metal, placing together side by side in the same coke fire one crucible charged with the pig iron without any addition of any kind and the other with the same pig iron to which was added the desired percentage or amount of ferro-titanium alloy to be experimented with. Both vessels were then submitted to the same heat, under the same conditions, for the same period of time, and the metal was cast in both cases in bars 1 x 1 x 13 inches long, square, and in round bars 1⅛ x 18 inches long.

When operating in a ladle we placed at the bottom of a receiving ladle the proper amount of alloy in coarse grains or fragments and poured the metal into the ladle from the cupola, stirred with a rod and cast in bars. A second ladle of the same capacity was then filled from the cupola (without any addition of alloy), and the metal cast also in bars.

When operating in the cupola, the alloy, in small fragments or pieces about the size of a nut, was charged proportionally to and with the different layers of pig iron, the cupola started and the metal cast in ingots and bars. The cupola was then dropped, charged with the same pig iron as before without any addition of alloy, and the melted metal cast in ingots and bars. By breaking the ingots the difference in the fracture, the closeness of the grain and other physical characters of the two metals could be observed.

In the results that are given below our results are tabulated per square inch after proper correction for measurements of the bars made before testing them. When tests were made by outsiders we give the results as they were communicated to us. The amount of alloy added was most generally 1 to 2 per cent., but sometimes as much as 3 and 4 per cent. Above the first two percentages the increase of strength is not apparently in proportion to the amount of ferro added. This is easily understood when it is considered that unless we operate in a crucible we are limited by the time, as it is not safe to delay the casting too long when operating in a ladle, and then a part of the ferro added may remain untouched, about 2 per cent. only being really utilized and incorporated. The same may be said, to a certain extent, when experimenting in small cupolas, but with larger cupolas the improvement increases decidedly with the quantity of alloy added. However, if it be conceded that, with 1 to 2 per cent. of alloy added, such an increase of strength as recorded is secured, the question of extra cost with greater additions may well be considered, as we cannot expect to increase the strength of cast iron beyond certain limits, and a maximum strength must necessarily be reached whatever may be the quantity of ferro-titanium added.

For ordinary use in foundries we have manufactured a special alloy (with carbon) containing 3.50 to 5 per cent. of titanium, which, like the higher alloys, can only be obtained in the electric furnace, and we have found

that such alloy melts at the temperature of cast iron and steel. We have cast it in regular pigs, and it can be used with other irons in mixture in the cupola. Some 3 to 4 per cent. of such alloy will secure the same results as 1 to 2 per cent. of the 10 per cent. ferro-titanium, and it does not require any preparation of manipulation. It is, to all purposes, pig iron like any other but very high in titanium.

Cast Iron Tests.

The alloy used in these tests was a ferro-titanium containing 10 per cent. titanium and 7 to 8 per cent. carbon. The square bars were cast 1 x 1 x 13 inches long, so as to leave 12 inches between bearings when tested. The round bars for tensile strength were 1⅛ inches diameter by 18 inches long. Bars were merely cleaned on the surface but not machined.

breaking it, and it was only after a number of such blows repeated on the same spot that small chips of the plate (almost forged) could be detached.

When we have quoted experiments made by outside parties in the preceding tables we have recorded the results as they were communicated to us, as will appear from the following:

In a letter of Wm. Cramp, of May, 1901, we find: "Our tests with ferro-titanium in connection with iron castings made from a crucible have shown an increase in tensile strength over our ordinary castings of about 29½ per cent., and over cast iron with an addition of nickel of 4 per cent."

In a letter of August 20, 1902, C. V. Slocum, president Keystone Car Wheel Company, Pittsburgh, writes:

"For the first half of the heat and during the time

Tests in Ladle.

By whom tests were made.	Pig metal tested.	Tensile strength in pounds per square inch. Breaking load.	Increase. Per cent.	Transverse strength in pounds per square inch. Breaking load.	Increase. Per cent.	Deflection at center of bars. Inches.	Inc. Per cent.	Remarks.
Car Wheel Works (in our presence).	Original.	21,000	..	2,200	..	..	..	
	+ 2 % alloy.	27,500	30	2,710	23	..	..	
	Wheel mixture.	....	..	2,900	..	..	..	
	+ alloy.	....	..	3,670	27	..	..	
Abendroth & Root, Greenpoint, N. Y. (in our presence).	Original.	20,500	..	2,030	..	..	..	Bars cast horizontally. Alloy used in lumps in a small ladle, 200 to 300 pounds capacity.
	+ 1 %	22,200	+ 8½	2,100	..	..	..	
	+ 2 %	24,600	20	2,200	10	..	..	
	+ 3 to 4 %	25,900	26	2,550	25	..	..	
	Original.	16,600	..	1,693	..	..	..	Bars cast vertically. (Same as above.)
	+ 2 to 3 %	20,600	24	2,350	39	..	..	
A. J. Rossi, Buffalo.	Original.	....	..	3,084	..	11	..	
	+ 1 % alloy.	....	..	3,550	15	13	18	Best foundry iron.
	+ 2 % alloy.	....	..	3,775	22½	14	27	

N. B.—Tests made by us or in our presence refer to a corrected area of 1 square inch.

Experiments in Crucibles.

By whom tests were made.	Pig metal tested.	Tensile strength in pounds per square inch. Breaking load.	Increase. Per cent.	Transverse strength in pounds per square inch. Breaking load.	Increase. Per cent.	Deflection at center of bars. Inches.	Inc. Per cent.	Remarks.
A. J. Rossi, Jersey City Foundry.	Original.	13,560	..	1,820	..	0.08	..	Very weak pig iron. Phosphorus, 0.89 per cent.
	+ 2 %	21,800	62	2,300	26	0.11	27	
	+ 3 %	23,600	74	2,400	32	0.13½	50	
Wm. Cramp & Son shipyard. Official report. Letter from Wm. Cramp.	Original.	20,372	..	2,046	..	0.11	..	Copy from official test.
	+ alloy.	26,409	29.60	2,473	21	0.14	27	
	.....	....	29.50	....	..	..	..	Second test.
Niagara Falls Foundry. A. J. Rossi.	Original.	21,000	..	2,150	..	0.09	..	
	+ 2 % alloy.	27,500	31	2,750	28½	0.12	33	
Car Wheel Works, Pennsylvania (in presence of A. J. Rossi.	Original.	22,900	..	2,275	..	..	..	Alloy in coarse grain.
	+ 2 % alloy.	30,000	31	2,850	25	..	..	
	Original.	18,000	..	1,900	..	..	..	Alloy in small pieces.
	+ 1 % alloy.	22.300	24	2,300	21	..	..	
	Wheel mixture	23,900	..	2,400	..	..	..	Granulated alloy.
	+ alloy 1 %	30,500	27½	2,900	21	..	..	
A. J. Rossi. Tests at Dr. C. F. McKenna. Reported by him.	Original.	25,400	..	2,500	..	0.10	..	Paterson, N. J. Pig iron for pipes.
	+ 2 % alloy.	30,500	20	3,100	24	0.125	25	

Experiments in Cupola.

By whom tests were made.	Pig iron tested.	Tensile strength in pounds per square inch. Breaking load.	Increase. Per cent.	Transverse strength in pounds per square inch. Breaking load.	Increase. Per cent.	Deflection at center of bars. Inches.	Inc. Per cent.	Remarks.
Keystone Car Wheel Company, Pittsburgh. Letter from president.	Car wheel mixture.	....	..	3,000 to 3,200	17 to	..	..	
	+ alloy.	....	..	3,500 3,740	25	..	..	
Car Wheel Works (in presence of A. J. Rossi).	Foundry pig	23,000	..	2,400	..	..	..	Alloy used in grains.
	+ 1 %	28,900	26	2,900	21	..	..	
	Wheel mixture	23,900	..	2,400	..	..	..	Coarse grain alloy.
	+ 1 to 2 %	30,000	25½	2,950	22½	..	..	
A. J. Rossi, Girard College, Philadelphia.	Best coke iron	24,960	..	2,600	..	0.13	..	
	+ 1 to 2 % (lumps)	28,860	16	2,880	11	0.15	15½	Warwick pig iron. Coke.
	Best charcoal Scotch pig.	28,000	..	2,800	..	0.14	..	
	+ 2 % alloy (lumps)	32,900	18	3,200	14	0.15½	11	Muirkirk Scotch pig. Charcoal.

The results of these tests go to show that the addition of from 1 to 4 per cent.—on an average 2 per cent. or less of a 10 per cent. ferro-titanium—to cast iron secures a very material increase in the strength of the metal. The amount of alloy added and the results obtained varied chiefly with the state of division of the alloy used, which was sometimes coarsely granulated, at other times in small fragments, frequently too large for a good incorporation of the greater amounts added, specially when operating in ladles. We have been able to alloy with the cast iron as much as 10 per cent. of the ferro, operating in a special manner in crucibles. The pig metal obtained contained 1 per cent. of titanium (1.04). Cast in slabs about 1 inch thick, it could not be broken with a 20-pound sledge, the blows making indentures in the metal without

no titanium was used a strength of about 3000 pounds was obtained from test bars, the highest strength observed being 3270 pounds. In the last half of the heat, during which a small part of the titanium was in the charge, the strength ran up at once to 3500 pounds, and one bar, which would evidently have run considerably over, was removed from the machine without breaking. We had bars breaking at 3740 pounds on different days, each of which contained titanium."

In a paper read by C. V. Slocum before the Railway Club of Pittsburgh, on November 28, 1902, he says:

"Titanium is known to be of great value in car wheels, having the effect of hardening the tread and strengthening all parts of the wheel, including the plates. . . ." And further:

"Our own experiments with the metal demonstrate that titanium in iron gives greater density to the metal, surprisingly increases transverse strength, and gives harder chill and wearing qualities to the wheel."

As far as steel is concerned, the results of German practice, as has been quoted above from *Stahl und Eisen*, corroborate in the main particulars those we have made ourselves with crucible steel on a limited scale, and the most interesting of which we give below. We made in all ten ingots of steel treated with titanium, and we used as addition ferro-titanium practically free from carbon (0.28 C.), containing 35.41 per cent. of titanium, and also a ferro-titanium with 35 per cent. titanium containing 7 to 8 per cent. carbon. This percentage of titanium was too high, as we and others have found by experience since. The incorporation was not as complete as it would have been with alloys containing only 20 to 25 per cent. titanium and even less, and the analyses of the steel showed that only a part of the ferro added proved effective.

Experiments with Crucible Steel.

The steel was cast in 100-pound ingots at Atha & Illingworth Steel Works of East Newark, N. J., and test bars of the United States regulation size—viz., 2 inches long between threads and 0.20 square inch area—were made from them. The ingots were drawn to regular size steel bars, from which were made cutting tools, drills and chisels. The latter were used for chipping hard steel ingots, and proved, it was said to us, particularly well adapted for this use, as the head "did not mushroom." The charges in the crucible were mostly scrap iron and low carbon steel, with no additions of managanese or tungsten, nor of slag materials, the carbon in the alloy added being depended upon to furnish the percentage desired in the finished product when carbon alloys were used.

The silicon in the steel was about 0.25 per cent., varying from 0.21 to 0.28 per cent., the phosphorus and sulphur at or below the Bessemer limit, the alloy being quite free from these elements.

Tests.	Tensile strength per sq. inch.	Elastic limit. Pounds.	Elongation in 2 inches. Per cent.	Reduction of area. Per cent.	Carbon in steel. Per cent.	Titanium in steel. Per cent
No. 1...	64,500	33,750	25.30	44.60	0.38	0.045
No. 2...	122,500	66,500	11.10	16.60	0.83	0.06
No. 3...	127,500	70,000	8.40	21.90	0.84	0.065
No. 4...	141,500 } 146,700 }	76,500	8.40	14.60	0.82	0.078
No. 5...	....	59,250 } 62,000 }	10.00	30.90	1.227	0.11 0.119

References and Quotations.

Nickel.—"Nickel and Nickel Steel," Am. Inst. Min. Eng., XXV, p. 51; "Nickel Steel," do., XXIX, p. 569.

Manganese.—"Manganese Steel," R. Hadfield, Am. Inst. Min. Eng., Vol. XXIII, p. 148; "Ferromanganese in the Blast Furnace." A Pourcel, Génie Civil, Tome VII, pp. 3, 21, 50.

Ferrosilicon.—"Ferrosilicon and Silicon-Spiegel." Génie Civil, Tome X, p. 134; do., XLI, p. 323.

Chrome.—"Chrome Steel Auer Chromé," Génie Civil, Tome X, p. 196.

Molybdenum.—"Effects on Iron," Am. Inst. Min. Eng., V, p. 454; *Eng. and Min. Journal*, LXVI, p. 430.

Tungsten.—Am. Inst. Min. Eng., "Effect on Steel," VII. 380; *Eng. and Min. Journal*, LXVI, p. 430.

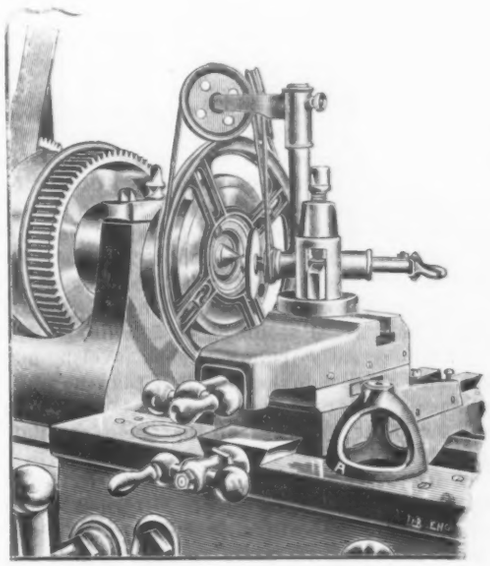
Vanadium.—"Vanadium and Its Alloy," *Eng. and Min. Journal*, LXXII, p. 544; LXX, p. 192.

Stahl und Eisen, June 1, 1901, Dusseldorf meeting, Vol. XXI, No. 11; and many other articles in *The Iron Age* and other technical journals.

As to the integrity of even stamped steel plates for boiler work, there is at times a weakness common to all. Michael Longridge, an English inspector of great experience in the premises, was called to survey a horizontal boiler, made in 1885, of ⅜-inch plates, working pressure 70 pounds per square inch, which failed by a crack in the solid sheets 11 inches long. When taken out the plate showed externally no faults or workmanship which would cause defects; neither did the tests for tensile strength or the analysis of the structure reveal anything, but submission to micrographic inspection gave a condition of things which led to the belief that the ingot had probably been overheated and the plate too slowly cooled after rolling. While the steel could not be called bad specifically, it was improperly handled in making, and no subsequent inspection could detect it. In steel works overheating is comparatively rare, but it does sometimes occur, and the thicker the plate the more liable it is to contingencies like the one mentioned.

A Simple Lathe Center Grinder.

A new lathe center grinder which is very simple in construction and operation has just been placed on the market by the Miami Valley Machine Tool Company of Dayton, Ohio. It is driven by a grooved pulley bolted to the face plate of the lathe. The pulley is quickly centered by using the cup marked A in the illustration. This is done by placing the cup in the circular opening in the center of the pulley and then bringing up the tail stock center to fit into the small hole in the forward end of the cup. The idlers over which the belt passes between the driving pulley and the grinder are easily raised or lowered by means of a thumb screw, thus furnishing quick adjustment for the belt.



A SIMPLE LATHE CENTER GRINDER.

Progress of Machinery Installation at the World's Fair.

The foundations for the large Westinghouse engines being installed in the Machinery Building at the St. Louis Fair grounds are completed, and a 40-ton electric crane is now at work depositing the various parts of the engines in their proper places. The foundations for the Allis-Chalmers 5000 horse-power engine which is to be installed are now being prepared by the Department of Machinery. The crane, which will be installed for the erection of the Allis-Chalmers engine and its generator and accessories, is being built by the Shaw Electric Crane Company of Muskegon, Mich. The crane will be of 60 tons capacity and electrically operated; 30 foot span, two trolleys, each of 30 tons capacity, and one of these trolleys is also provided with a 5-ton auxiliary hoist. The heaviest individual piece in the Allis-Chalmers Manhattan type engine and 3500 kw. Bullock generator, which it drives, weighs 84 tons. There are now something like 15 foundations for large engines either completed or in progress in the western half of Machinery Hall. Two of the engines are from Europe, one being a 1000 horse-power tandem compound steam engine from Mülhouse, Germany, and the other a 1500 h. p. vertical triple expansion, high speed steam engine from St. Denis, near Paris, France. The former unit is directly coupled to a 700 kw. generator built at Belfort, France, and the latter is coupled to a 1100 kw. generator built in Paris. These two units serve the arc or patrol lighting system. The largest individual engine unit in the Intramural power plant is a 1750 horse-power gas engine from the firm of A. Borsig, Berlin, Germany. The total horse-power generated in Machinery Hall is something over 45,000 horse-power.

Notes from Great Britain.

The Market.

LONDON, October 31, 1903.—The Midland market this week has been adversely affected by something more than the mere rumor of an American invasion. Persistent statements have been in circulation that the United States Steel Corporation have sold steel billets in South Staffordshire, and that more are on offer. It is undoubtedly a fact that billets have been offered, but I do not think as yet business has been done. The movement so far has been merely "feeling the market." There can be no doubt that agents of the Steel Corporation have expressed themselves willing to accept contracts at low prices, but before business can be done they have wanted to know more as to the extent of the orders. But consumers generally, both in the Midlands and elsewhere, are not prepared to make long contracts—not even three months.

This note of hesitancy and uncertainty is characteristic of the market at the present time. Thus more or less tentative offers have certainly, in a few days, tended to disorganize the market. There is no slump, prices having, as a matter of fact, been on a fairly low level before. But it is recognized that if America is determined to sell, a further decline in price cannot be resisted. Then, again, German prices have fallen. Recently billets and sheet bars from Germany were quoted as high as 91 shillings 6 pence, but there has been a decline to 88 shillings and less. The effect of this relapse was immediately seen on Welsh billets, which were quoted and sold at 90 shillings, or 2 shillings 6 pence below prices recently ruling. Some Welsh makers, however, still decline to look at less than 95 shillings. With the present marked uncertainty, it is not surprising that all the other branches of the trade are flat and unprogressive.

There are scarcely any inquiries for pig iron, and though, when tested, smelters quote full prices, there can be no doubt of a disposition to shade prices; but consumers are not doing any more business than is imperative at present prices. In the finished iron departments prices are maintained, but no strength is developed. For the ordinary run of bars business is meager and unremunerative. A disturbing element is the situation in the Far East. The Russian Minister at Pekin has officially warned the Chinese Government of the consequences of taking sides with Japan in the present dispute. It is undoubtedly a fact that the Japanese Government have placed large orders with certain British firms for explosives, field telegraphs and other war material. The greatest secrecy is observed in the carrying out of the orders, which are to be executed and delivered before the end of December. The orders were placed in Great Britain after considerable inquiry in America and Germany, quickness of dispatch being the main consideration. This requirement being met by the British makers, no expense is being spared by the Japanese Government. Another significant fact is that cables are being received from China and Japan to forward all goods in British bottoms, while other cables from Japanese buyers are in the nature of instruction to insure goods against war risk.

It is reported this week that 1000 tons of tin plate bars have been sold by the United States Steel Corporation for shipment to Swansea. The price accepted is stated to be about 7 shillings 6 pence per ton less than that quoted by local producers.

The German Problem.

Disquieting though the situation has become, in consequence of the threat of American competition, we are still even more puzzled at the moment as to the actual situation in Germany. The situation there is certainly better than it was this time last year, as is evidenced by the data collected by the association of German iron and steel masters, from which we learn that the production of pig iron in the German Empire (including Luxemburg) amounted during the month of September, 1903, to 848,889 tons, against 718,702 tons in 1902, 625,220 tons in 1901, showing an increase of 130,187 tons, or 18.11 per cent., as compared with last year, and of 223,669 tons, or 36 per cent., as compared with September, 1901. The total output during the first nine months of the year amounts to 7,524,593 tons, against 6,175,235 tons last year, and 5,871,859 tons in 1901, showing an increase compared with last year of 1,349,158 tons, or 21.85 per cent., and in 1901 of 1,652,734 tons, or 28.15 per cent.

This seems substantial, as far as it goes, but upon the other hand the chairman of the Union Iron & Steel Company at Dortmund, at the annual meeting of that company, in reply to inquiries from shareholders, stated that the first quarter of the current fiscal year the company's shipments amounted to 90,574 tons, against 68,216 tons in the same quarter last year, but the increased business was not sufficient. Prices are as low now as they were last year. The Union Company have banked one of their old furnaces at Dortmund, as it could no longer be profitably worked. As regards the future course of trade this would depend upon whether the syndicates now under negotiation would be concluded or not. An agreement among the various branches of the iron trade in Germany was especially necessary now, as the trade was threatened with active American competition.

If there are some significant facts pointing to the possible artificial condition of the German revival, there are other facts pointing to the substantial nature of it. For example, the Krupp Steel Company are expending $5,500,000 on the establishment at Rheinhausen of three more blast furnaces, basic steel making plant and various rolling mills, &c.; the Hoesch Iron & Steel Works Company are having a new bar mill built at Dortmund, and are extending their gas power plant for utilizing on a larger scale the waste blast furnace gases according to the system which is becoming general in Germany, and which is claimed to be more economical than the use of steam engines; the Bethlen-Falva Iron & Steel Company of Schwientochlowitz have just completed new rolling mills, which will be started in the course of a few days. In addition to these, there may be cited, among others, the large extensions which are being carried out at the Rothe Erde Steel Works, while even as far distant from industrial Westphalia as Dantzig, the Northern Electricity & Steel Works Company are now completing Siemens-Martin steel works and rolling mills for the production of 60,000 tons per annum. Further evidence of their recovery is to be found in the preparations which the German iron and steel firms are making to strengthen their position.

German Rails for the United States.

The Berlin *Lokal Anzeiger* states, with some show of authority, that large orders for rails and construction iron have been placed with Rhenish-Westphalian firms by a contractor to several railway lines on the United States Pacific Coast. It appears that since the beginning of the year this same contractor has already drawn from Rhenish-Westphalia railway material valued at some $5,000,000. The material will be shipped from Rotterdam, Antwerp and Hamburg in sailing vessels proceeding to San Francisco and portland, returning with wheat, so that freight will be reduced to a minimum. It is questionable, however, whether the Rhenish-Westphalian works are earning any profit at all on the transactions.

Wages in German Steel Works.

In connection with German competition, some facts from an Essen Chamber of Commerce report on Krupp's works will be interesting, and especially the point that the average wage per day at the steel works is about 4 shillings 6 pence, while two years ago it was 4 shillings 8 pence. The day is probably one of ten hours, including Saturday, so that the average wage per hour is about 5½ pence. The wage is 49 per cent. higher than it was 30 years ago, and 240 per cent. more than 50 years ago. There are 41,013 men engaged, with 4046 officials. Of these 22,970 were at the Essen works, where ordnance and armor plate are made; 3062 at the Germania Shipyard; 5710 at the blast furnaces, where 1782 tons of ore are smelted per day, and 6620 at the coal mines, where the output is 1,500,000 tons per annum.

The Progress of Standardization.

The Engineering Standards Committee have issued another statement upon the subject of electrical pressures and standard frequencies. At an early stage in their deliberations the subcommittee decided that the

most advantageous method of approaching this problem, beset as it is with so many difficulties, would be from the point of view of those most affected—namely, the users of lamps and of motors for power purposes. It was, therefore, agreed that the standard pressures to be suggested should be measured at the consumers' terminals as settled by Act of 1899.

After careful consideration, it became evident to the subcommittee that the direct current pressures of 110, 220, 440 and 500 volts would best meet the requirements, because carcases built for these standard pressures could be utilized for pressures 10 per cent. above or below the suggested standards, without any alteration whatever in the castings or mechanical components by merely altering the windings and excitation.

Before coming to their final decision the Subcommittee on Generators, Motors and Transformers conferred with the Subcommittee on Electrical Tramways, and a joint meeting took place, with the result that the pressure of 500 volts for tramways, which most concerned the latter subcommittee, was agreed to, and, in addition to the pressures already agreed to, 600 volts was decided upon as the standard pressure for electrical railways.

It was deemed advisable to fix upon the standard frequencies at the earliest possible stage of the work, as no progress could be made in the standardization of prime movers for driving alternate current machinery until such time as the frequencies had been settled upon. On this question there appeared to be a great preponderance in favor of frequencies of 25 and 50. The only point upon which any serious difference of opinion appeared to exist was the advisability of the adoption of a third frequency of 40 or 42, to enable rotary converters to be used to the fullest advantage. All the arguments in favor of this third frequency were fully discussed, but the subcommittee decided not to recommend the adoption of more than two frequencies.

The following are the resolutions on standard direct current pressures and standard frequencies:

1. That the standard direct current pressures, measured at the consumers' terminals, be 110, 220, 440 and 500 volts.

2. That the standard direct current pressures, measured at the terminals of the motors, be, for tramways, 500 volts; for railways, 600 volts.

3. That 25 periods per second be the standard frequency for: *a*, systems involving conversion to direct current by means of rotary converters; *b*, large power schemes over long distances; *c*, three-phase railway work, where motor gearing and the inductive drop on the track rail have to be considered.

4. That 50 periods per second be the standard frequency for: *a*, mixed power and lighting on town supply mains; *b*, ordinary factory power plants; *c*, all medium size power plants, where rotary converters are not employed.

The Indian Government has sanctioned the payment of £1000 as a grant in aid of the work of the Engineering Standards Committee for the present year.

Anthracite Coal Combine.

After negotiations extending over many months the Welsh anthracite combine is at last an accomplished fact. The South Wales Anthracite Amalgamation Syndicate (Limited) approached 90 per cent. of the mine owners, and this number agreed to sell. The aggregate amount of proved coal in the mines acquired is 90,000,000 tons, and the annual output is 1,000,000 tons. The mines have been carefully selected, and care taken not to pay fancy prices. The amount of the purchase price is not yet known.

The Production of Coal.

A Parliamentary return relating to the coal production and consumption of the principal countries of the world, issued this week, shows that Great Britain in 1902 produced 227,095,000 tons; the United States, 268,688,000 tons; Germany, 107,436,000 tons; France, 29,574,000 tons, and Belgium, 22,769,000 tons. Less coal was produced in 1902 in Germany and France than in either of the preceding years. The quantities produced in Great Britain, the United States and Belgium were greater than in 1901, and in the first two countries exceeded those produced in any previous year. The total known coal production of the world (exclusive of brown coal or lignite) is now about 700,000,000 tons (of 2240 pounds) per annum, of which Great Britain produces rather less and the United States rather more than a third. As compared with its population, the production of coal in Great Britain still surpasses that in the United States. It amounted to 5¼ tons per head of the population in 1901 and 5½ tons per head in 1902, while in the United States it is still only just over 3 1-3 tons per head. In Belgium it also amounts to about 3 1-3 tons per head, in Germany to rather less than 2 tons per head and in France to about ¾ ton per head.

The average value per ton of the coal produced at the collieries in the five mentioned countries in the year 1901 showed a fall of about 1 shilling 6 pence per ton in Great Britain and 1 shilling 9 pence per ton in Belgium, but a rise of 6 pence per ton in Germany, 7 pence per ton in France and 3 pence per ton in the United States. The provisional figures available for 1902 indicate a further fall of 1 shilling 1 penny per ton in Great Britain, while in Germany there has been a return to the level of 1900, and in the United States a further rise of 3 pence per ton. But in spite of the fall in prices in this country the average value continues considerably higher than it was before the great rise which took place in 1900. In the United States, on the other hand, in spite of the enormously increased output of recent years the rise in the price of coal is much less noticeable.

Railroad Notes.

Following their American colleagues, the English railroad companies are now pursuing a policy of retrenchment. The Midland and the Caledonian Railroad companies are putting thousands of men engaged in their works on short time, owing, it is stated, to the high cost of labor and materials. In the London & Northwestern Works at Crewe, several hundred men have been reduced to five days' work a week, and a number of other men have been discharged.

American locomotives on English railroads are by no means a modern introduction. In 1840 the Midland Company employed them on the Lickey incline, near Broomsgrove. Fourteen engines were ordered from the Norris Works of Philadelphia. They did all that was expected of them. Their chief peculiarity was that their driving wheels were only 2 feet in diameter. The Yankee locomotives have, however, long since been superseded; and the Lickey incline is now worked by ordinary engines, aided by a "pilot," with perfect efficiency and success. The last of Norris' engines was used for some time on the Tewkesbury branch.

Colonel Yorke, the inspector of the Board of Trade specially concerned with railroad accidents, in reporting upon the Glasgow collision last July, expresses the opinion at the end of his report that the time has come for a reconsideration of the brake question in this country. The speed and weight of trains are, he states, ever on the increase, and the rapidity with which brakes can be brought into operation becomes daily of more importance. It is, therefore, surprising to find that the modern improvements in brakes have not been adopted in Great Britain, and that English railway rolling stock is still fitted with the same pattern of brakes as were introduced 25 years ago.

The engineering business mainly concerned with locomotives, known as Robert Stephenson & Co., and owing its origin to George Stephenson, the father of the locomotive, which was turned into a joint stock concern four years ago, has since experienced nothing but ill luck. The result of the trading for 1902 was a loss of £31,800, and numerous attempts have been made to raise funds. Connected, as it is, with such names as Armstrong, Pease and Furness, it is curious that this company have been losing £1000 apiece on most of the engines turned out. The attempt to put the company in possession of needful funds has, up to the present moment, proved abortive, and it almost looks as if the debenture holders will step in some day soon—a peculiarly unsatisfactory ending to an engineering concern associated with the great name of George Stephenson. S. G. H.

A decree is published, fixing May 1, 1904, as the date for presenting tenders in Santiago for the construction of the Chilean end of the Transandine Railway. The Government has agreed to guarantee 5 per cent. on a loan of capital not to exceed $7,500,000.

The Pacific Coast Trade.

SAN FRANCISCO, CAL., November 2, 1903.—The imports of pig iron this year will be considerably in excess of those of last, indicating an increase in consumption and in the activity of our iron industries. These are coming to be quite varied and prosperous, although from the necessities of the case they are on a small scale. We have even done something in the way of producing architectural iron, though not much can be predicated from that, for when the tide in the iron industry in the East is at its ebb this market will be supplied with stocks from that section which will not only effectually keep out the foreign material, but will also stop production here too. That is the disadvantage of having a restricted market. If we had an establishment that would work for the trade of the Orient matters would be different; but, with many promises of having such an institution, there has been no performance as yet, and as matters now are in the financial world it hardly seems as if there could be. And yet no one could at the present time pass through the leading streets of San Francisco and those adjacent to them without being struck by the size and number of buildings going up where the whole of the frame work is structural steel. As this city has entered on an epoch of good times, it will be the same for a couple of years more. There is room enough; the capital and the enterprise alone seem to be lacking.

The imports of pig iron for the past couple of weeks have been quite large. The following vessels have arrived with it: the "Alice Maria," from Newcastle, England, 700 tons; the "Crown of England," from the same port, 559 tons; the "Genevieve Molinos," from Hull, 400 tons; the "Monkbarns," from Liverpool, 1150 tons, or a total of 2809 tons. Our imports of other iron and steel in the same two weeks have been very large. Leaving out what has arrived on the Panama steamers, the "Clan Graham," from Hamburg, had a lot of charcoal iron; the "Genevieve Molinos," 6362 bars of merchant iron; the "Monkbarns," 1920 boxes of tin plate, and the "Ben Dearg," 19,940 packages of steel and 500 tons of iron. The import of tin plate from foreign countries, of which an instance is here given, has been very light, only 1140 boxes in the months of July, August and September. This may be regarded as accidental, as we have been supplied by the great tin plate combine for many years. This year we have not used quite as much tin plate as in other years on account of the falling off in the salmon pack of the coast. As the English market is open once more to California canned fruit and vegetables, we look for an increase in the output next year, and an increase also in the amount of tin plate used, so that there will be larger importations and more room for foreign on account of the drawback on goods exported in tin cans from foreign tin plate. In dwelling on these matters we note a considerable importation of agricultural implements on the "Barracouta," via Panama, which shows that our local manufacturers are still open to competition in this line from the manufacturing centers of the East.

General business has been quite good during the month of October in hardware, iron and steel, as well as in other lines. For the present week the city election has interfered more or less with it. J. O. L.

In spite of the adverse reports of the Moseley commission of expert English artisans in several trades which visited this country a year ago to observe our methods, it appears from foreign papers that some of them, at least, have been adopted. A long list of concerns is given that have installed the one-break plan, as it is termed in England, in their working hours. It has been the custom there from time immemorial to begin at 6 o'clock, work until 7 and then take an hour off for breakfast. Now the men get it before they come to work, and quit for dinner at 12 o'clock. It is stated that the work done upon empty stomachs, or a little oatmeal as an apology for a breakfast, is very unsatisfactory, and although it was difficult to induce the men to change from a way of working in use for many years, the number of concerns which have adopted the no break system is increasing rapidly. Prejudices die hard, but they die all the same, and the logic of results is unanswerable.

Tail Stock Patent Decision.

Judge Colt of the United States Circuit Court at Boston, Mass., has handed down a decree in the patent case of Prentice Brothers Company of Worcester, Mass., *vs.* Manning, Maxwell & Moore. The court sustains the patent issued to Vernon F. Prentice on the overhanging engine lathe tail stock. Manning, Maxwell & Moore were only nominal defendants in the suit, 15 American machine tool builders standing back of them, the purpose of the suit being to establish the validity of the patent, over which there had been a great deal of contention. The decree is according to an agreement between the parties. The machine tool builders interested directly in the case have been granted shop rights for the overhanging tail stock, and the matter is ended, so far as they are concerned. Other manufacturers had been previously granted these rights. The Prentice Brothers Company state that they propose to push their rights with all manufacturers who are infringing upon this patent. There will be no attempt to take the case to a higher court, the litigation being entirely ended. The decree follows:

On motion of solicitors for complainants and with the consent of solicitors for defendants, it is hereby ordered, adjudged and decreed, that United States Letters Patent No. 553,594, dated January 28, 1896, granted to Vernon F. Prentice on an engine lathe, are good and valid at law; that said Vernon F. Prentice was the original, first and sole inventor thereof, and that complainants are the owners of said letters patent and of all rights and privileges thereunder; that said defendants have infringed claims 1 and 2 of said Letters Patent No. 553,594 by selling engine lathes containing the invention of said claimants without license or right and in violation and infringement of said letters patent, and the exclusive rights secured thereby; that an injunction issued out of and under seal of this court directed to the said defendants, Henry S. Manning and Charles A. Moore, doing business under the firm name and style of Manning, Maxwell & Moore, strictly enjoining them and each of them, their servants, agents, workmen, attorneys and employees not to make, use or sell or cause to be made, used or sold, any engine lathe or other device containing or employing the invention covered and secured by claims 1 and 2 of said Letters Patent No. 553,594. And it further appearing to the court that the complainants have waived their claim for damages, profits and cost for said infringement, it is further ordered, adjudged and decreed that this decree be made final without recovery to complainants.

Washers Made from Wire.—The American Wire Washer Company of Unionville, Conn., are making steel and copper washers by a new process. The wire is fed to the machine from a coil and is cut of the proper length to make a washer of the desired diameter. The next operation bends the piece into a U shape, which is then formed into a perfect ring. The next operation, all of which are automatic, compresses the ring into a perfect washer. The machine will provide 300 pounds of washers per day of ten hours, and, of course, with no waste.

Work was begun November 6 in developing the water power of the Chicago drainage canal at Lockport, Ill. A contract for three sections is in the hands of Joseph J. Duffy & Co. of Chicago, the fourth being in the hands of Lorimer & Gallagher. Both firms placed large bodies of men at work, and will push the work all winter. It is estimated that the cost of the improvement is $2,800,000, and the contracts require completion within three years. Upward of 30,000 horse-power will be developed, and it is the purpose of the Sanitary Commission who control the drainage canal to sell this power to manufacturing industries in Joliet, Lockport and Chicago, as well as to traction companies.

A Rapid Method of Finishing Gear Blanks.

An interesting method of turning and facing gear blanks and similar work is in use at the works of the Lodge & Shipley Machine Tool Company, Cincinnati, Ohio. Through the use of it the necessity of calipering the work is obviated and the rate of production is increased considerably. The work is performed on a double lathe of special construction, as shown in Fig. 3. One operator attends to both ends of the lathe.

In turning and facing gear blanks, they are first placed singly on a hardened steel plug, which serves as a mandrel, in one end of the lathe, as shown in Fig. 1. This mandrel has a fixed key formed on its side, and as the blanks have previously been bored and key seated, they are in position for the facing operation without further fastening as soon as they are slipped upon this plug. The tool, which is held in a special form of tool post, is brought against the end of the plug, thus giving the depth of cut which is to be taken off of the hub and side of rim. The tool is then fed outward.

After having been faced off in this manner several of the blanks are placed on a mandrel together with a hardened steel step gauge, as shown in Fig. 2. This arrangement is on the other end of the lathe, where the diameters are turned. The tool is brought up to the step corresponding to the diameter to which the blanks are to be turned and the cut is taken in the ordinary manner.

While the method was inaugurated principally for the finishing of gear blanks, it has been found very convenient for producing a wide range of work where duplicate parts are made in large numbers. Extending the scope requires only the increasing of the sizes and variety of the gauges.

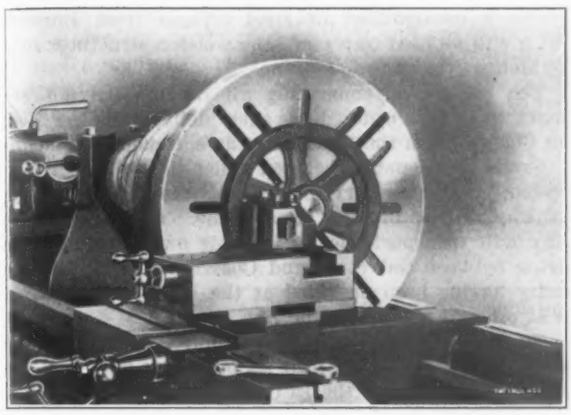


Fig. 1.—Method of Facing Hubs and Rims.

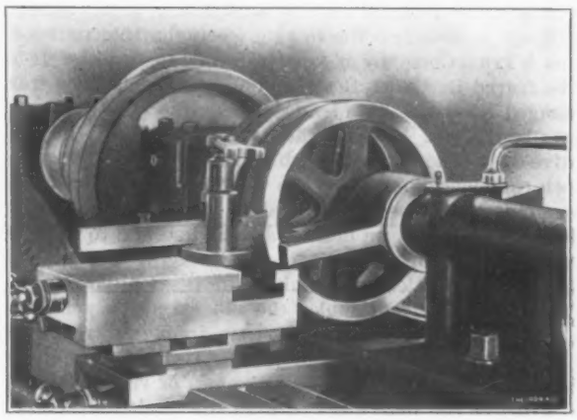


Fig. 2.—Showing Step Gauge Used in Setting Tool to Diameters.

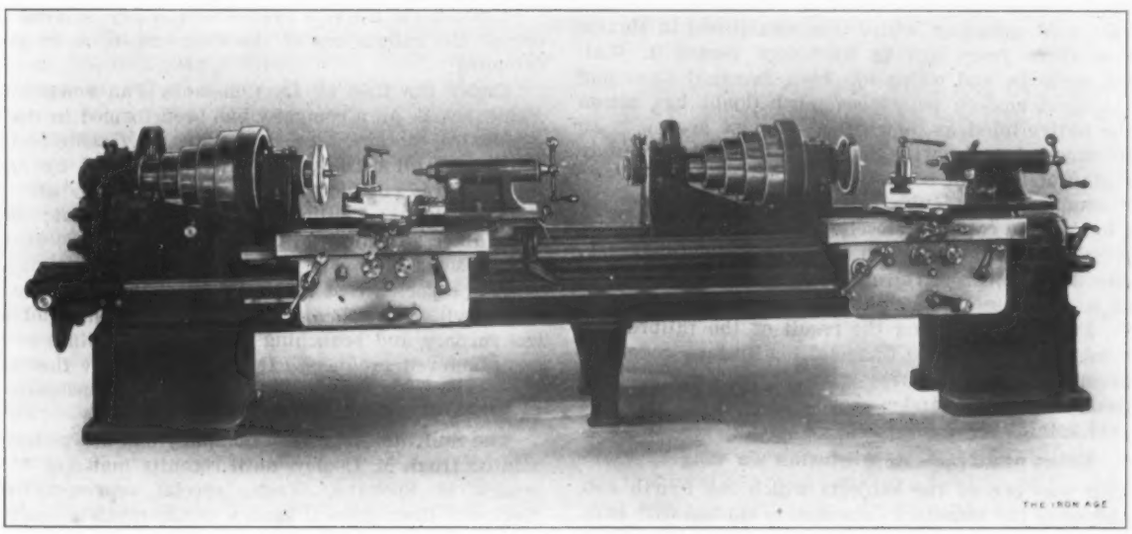


Fig. 3.—The Double Lathe on Which Both Operations are Performed Simultaneously.

A RAPID METHOD OF FINISHING GEAR BLANKS.

Australian Definition of Machinery.—Our Australian correspondent writes that the customs definition of machinery is that "a machine or piece of machinery must mainly consist of solid parts, which, when the machine is in operation, are in continuous motion relatively to each other. There must, for example, be wheels revolving or cranks or levers moving all the time. A steam engine, pump, sewing machine, lathe, loom, and a quartz mill are thus machines, but a gas retort, a boiler and system of pipes for heating a building, a still with its worm, and so forth, are not machines. The miniature mechanism of pressure gauges, taps and valves, which are moved only occasionally, do not constitute the gas making or heating apparatus a machine."

At Lancaster, Pa., on November 7, in the County Court, Judge Landis, before whom an application was made for a receiver for the Susquehanna Iron & Steel Company, rendered an opinion in which he refused to appoint a receiver or dismiss the petition, but gives the company until January 1 next to establish a stable basis. The judge says that if between this date and January 1, 1904, the officers can satisfactorily show that the finances of the company can be and have been placed in such shape as to secure the continuance of the business and a reasonable likelihood of their future success, he will dismiss the bill. If, on the contrary, they are not able to do this he will appoint some disinterested person as receiver.

Notes from Mexico.

A Bank Failure.

DURANGO, November 5, 1903.—The influx of foreign capital and the rapid development of the country's railways, mines and other material interests within the last dozen years have naturally called into existence a number of banking institutions financed by outside capital. These enterprises have been of great service in facilitating business operations and have been generally successful, paying dividends which would be considered large in countries where money is more plentiful and whose natural resources are either much more extensively or wholly developed. In the matter of the stability of its banking institutions the Republic of Mexico can point to a record of almost unbroken solvency, the failure or suspension of a bank legally established being almost unknown until a few weeks ago, when the International Bank & Trust Company of America closed their doors. It is to be feared that with the incoming of financial concerns managed according to advanced ideas the care and conservatism which have marked the management of the native institutions, and which have gained for them so much confidence and respect in the minds of the business community, have been sacrificed in the desire to unduly extend operations in a brief space of time and to imitate some of the worst features of ephemeral institutions familiar to frontier communities in the United States. While it is true that under the old system which prevailed here business operations were frequently retarded by the antiquated methods of the native banks, the mere issuing of a draft necessitating the loss of valuable time, nevertheless the individual making the remittance entertained no fears in regard to the prompt honoring of the paper upon its presentation. In the light of the revelations following the suspension of the International Bank & Trust Company, an institution capitalized at $10,000,000, gold, on paper, which was established in Mexico two or three years ago by financiers versed in Wall Street methods, and which has been managed according to the most modern principles, much doubt has arisen in the native mind as to whether the new system is an improvement or otherwise upon the slow but absolutely sure plan of the ante-boom period.

Fortunately, the evils attending the suspension of this bank were confined closely to the orbit in which it operated. The mild sensation following the failure quickly subsided, the concern's relations with other banks not being so intimate or important as to affect them in any way. For the time being the result of the failure will be a loss of confidence in financial institutions under the management of individuals schooled in United States methods of banking, and a more generous patronage of the old established banks.

Effect of Silver's Depreciation on Wages.

This was one of the subjects which the fourth subcommittee of the Monetary Commission studied with care. The conclusions reached cannot fail to be of interest to employers of labor in other countries. The question considered was, "Whether wages and salaries have risen in every department of national labor; whether the rise is proportional to the rise in exchange, and whether the price of labor has been the last to rise in the midst of the extraordinary enhancement of the cost of living." Considering all the factors bearing upon the question, the committee find that only in one or two exceptional instances has there been an advance in the rate of wages paid to workmen, the conclusion arrived at being, in their own words: "Wages and salaries earned by the consuming class have been almost uninfluenced, remaining with a few unimportant exceptions at the same level as prevailed before the depreciation of silver set in."

This condition the committee consider "quite natural," owing to the fact that labor constitutes the most numerous class; the facility with which laborers and employees can be individually replaced, and their inability to get together for the protection of their common interest.

A tribute to labor unions is paid in a paragraph, which may be quoted, seeing that the subcommittee have had the advantage of observing trade unions from the distance which is said to "lend enchantment," and not at close range, which frequently awakens feelings other than that of admiration:

> These conditions apply with special force to our country. In Europe and the United States labor of every kind has succeeded in associating itself into various forms of organization, either for mutual aid or for defense against the employers. Such is the origin of the trades unions in England, the miners' leagues and the Knights of Labor in the United States and the aid societies of France.
>
> In the case of Mexico, no organizations of this kind exist or can exist for a long time to come, owing to the lack of education of our laboring classes, especially of the indigenous race, a lack of education which causes them to be easily ruled by their masters and the owners of rural estates, and which prevents them from organizing for the defense of their common interests.

Industrial Notes.

The Mexican Central Railway Company will shortly receive a consignment of steel bridges from England, which will be used to replace the wooden structures upon the Monterey and Tampico line.

Ten tank cars, embodying all the modern improvements, have been ordered for early delivery by the Mexican Central from the American Car & Foundry Company.

Crude petroleum, to be used under the boilers of three locomotives in the service of the National Tehuantepec Railway, will be brought from Texas. The railway company will transport the oil in their own tank steamers plying between Galveston and Coatzacoalcos, storage capacity having been provided at the latter place, as well as at other points along the line.

The F. M. Prescott Steam Pump Company of Milwaukee, Wis., have obtained an order for two triple expansion engines from the El Oro Railway & Mining Company in the State of Mexico.

The rate of exchange to apply in the payment of import duties in the month of November has been fixed by the Treasury Department at 220 per cent.

The electric traction system of the city of Vera Cruz, one of the enterprises of the Pearsons, is to be greatly extended.

Under the title of La Compania Pan-Americana de Vehiculos, S. A., a company has been formed in the City of Mexico to take over the business of manufacturing vehicles of all classes, originally established by Samuel W. Walker. The officers of the new company are: J. O. Rice, president; Emilio Leyugul, vice-president; Samuel W. Walker, director and treasurer, and Ignacio M. Perez Castro, secretary.

It is reported that the directors of the Monterey glass works will greatly enlarge the present plant, adding a gas furnace and branching out into other lines of glass manufactured products. It is asserted that the sum of $400,000 gold will be expended in the improvements and additions contemplated.

The Sullivan Machinery Company of Chicago have appointed Hugh M. Cooley, until recently manager of their branch in Spokane, Wash., special representative in Mexico of their general agency in the capital.

The anthracite coal lands in the State of Sonora are again the subject of legal complications, suit having been brought in the courts of California by George W. Jackson against the directors of the Mexican Anthracite Company, the Mexican Coal Mining Company and the Mercantile Trust Company, the latter of San Francisco, alleging fraud in a transaction involving the purchase of a large tract of coal lands in the State named. The complainant, who bought $70,000 of the bonds issued by the Mexican Anthracite Mining Company, alleges that the company purposely forfeited the lands by failing to fulfill their contracts, and that the bonds are worthless.

Herman Unzicker, representing the Allis-Chalmers Company of Chicago, is making a tour of the principal mining districts of Mexico in the interest of the company.

The Mexican White Lead Company have been organized with the object of building a large plant at Gomez Palacio, in this State, for the manufacture of white lead.

E. G. Spilsbury of the Spilsbury Engineering Company, 45 Broadway, New York, will soon let contracts for equipment comprising concentrators, screens, shovels, conveyors and other requisites, to be used in extensive mining operations in Guanajuato.

A Mexico City journal in a review of local trade move-

ments says: "Business has continued active, both in retail sales over the counters and in wholesale for interior points, and the reports of good crops generally are confirmed. The large dry goods and general drapery houses have been busy all the week, and also the hardware and machinery houses."

Of Mexico's copper exports 7525 tons went to Liverpool and South Waltes during the first nine months of the fiscal year 1902-3, and 2505 tons to Havre, an increase in both cases over the quantity shipped to the same destinations in the preceding fiscal year in the corresponding period.

A receiver has been appointed to wind up the affairs of the vehicle house of the Charles H. Shafer Company of the City of Mexico. The assets are given as $115,151.52, with liabilities $42,610.56. It is expected that the company will pay all claims and resume business.

Regular shipments of steel rails and structural steel are being made by the Monterey works. The structural material for the large new slaughter houses to be erected in the capital will be the product of the plant, and the company have many orders in hand for both rails and building material.

The Mexican Petroleum Company, at El Ebano, near Tampico, intend to increase their present plant, as also do the Mexican Coal & Coke Company, who are developing the coal lands at Las Esperanzas, in the State of Coahuila.

A sugar mill of large capacity is to be erected upon the lands of the Rio Tamasopo Sugar Company, in the valley of that name, west of Tampico. The manager of the plantation is George D. Coleman. Russell B. Harrison is interested in the company. United States manufacturers of sugar making machinery would greatly increase their business in Mexico by making a thorough canvass of the plantations, as the industry of sugar manufacture is rapidly increasing. Many orders for equipments are going to European countries. A complete plant of large capacity has recently been transferred from Louisiana, by way of Mobile, to the Isthmus of Tehuantepec.

A permanent association has been formed in the capital, whose objects are to promote commercial relations between Mexico and the empire of Austria-Hungary, and to supply information in regard to the advantages which this country offers to emigrants.

Among recent concessions granted by the Government is one to the San Carlos Copper Company, to build a line of railway of standard gauge from Linares, in the State of Nuevo Leon, to the mining district of San José, Tamaulipas, with the right to extend the line to Soto and San Enique, in the same State. Ten km. of track must be completed within two years, and at least an equal distance each succeeding year until the road is finished. The company have deposited $25,000 in bonds as a guarantee.

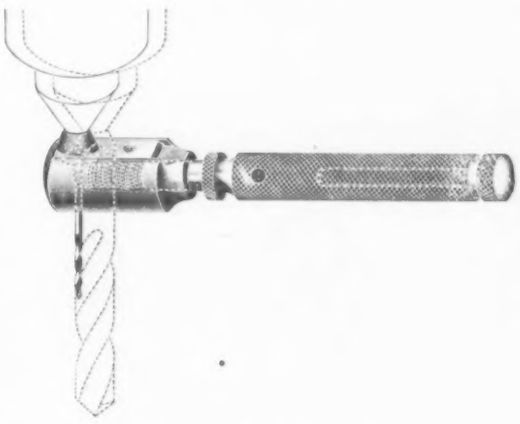
Right to use for motive power 5000 liters of water per second from the river San Pedro, in the State of Tabasco, has been obtained by Señor Amalio Ocampo. The plant will be constructed at the falls of El Randal, and work must begin within six months. The concessionaire has deposited $5000 to guarantee the performance of his part of the contract with the Government.

The report is current that the managements of the three railway systems in which the Federal Government is interested, The National, International and Interoceanic, will shortly be concentrated under one head, with quarters in the capital. Walter Morcom, general manager of the Mexican Southern Railway, is said to have been selected as the representative of the Government in the general management of the amalgamated companies. J. J. D.

Electrical requirements of every kind will be in good demand for some time to come in Australia. A scheme is on foot, and likely to be quickly put through, for the conversion of the Melbourne Suburban Railway system to an electrical one. On every hand one hears of new electrical schemes, and those of American firms who are now on the spot should find their Australian branch prove profitable in the near future.

The O. K. Drill Holder.

The new drill holder made by the O. K. Tool Holder Company of Shelton, Conn., will take drills from No. 60 to 5-16 inch. The drill is provided with a back floating center, which automatically assumes a position exactly in line with the point of the drill. This is accomplished by the floating center on the back of the holder having a countersunk hole on the inside of the plate, in line with the center which engages with the tail stock center. All drills up to ½ inch are made with pointed ends, and this point engages with the countersunk hole on the inside of the floating center, thereby locating the center in line with the point of the drill. By the use of this tool the female center is entirely avoided, as is also the necessity of using a chuck to fit the tail stock. It also enables the operator at all times to tell the exact strain that his tool is under, and thus avoid overloading. Inserted in



THE O. K. DRILL HOLDER.

the handle is a little bar, which can be removed and used for tightening the drill by inserting it in the hole shown.

New Publication.

Gas Engine Troubles and Remedies. By Albert Stritmatter. The Gas Engine Publishing Company, Goodall Building, Cincinnati, Ohio. 112 pages, 5 x 7 inches. Illustrated. Price, $1.

This book is a collection, with certain additions, of articles originally appearing in the *Gas Engine*. The author in his preface calls attention to the fact that in spite of the growing use of gas engines as prime movers very little of a comprehensive nature is available in the way of treatises upon the characteristics of the machine, the troubles commonly experienced with it, and the causes and remedies therefor. The book is not intended to deal in any way with gas engine design or construction, but to serve simply as a guide to the gas engine operator in locating and correcting the troubles experienced from time to time. The lack of thorough understanding of some of the really elementary principles of gas engine practice is noted as being responsible in a large measure for the inability of many operators to recognize quickly the primary cause of a failure of the engine to start or to carry its load uniformly and economically. The author's method of treating the subject is by separate consideration of the various more important features of the engine, giving under each head numerous examples of difficulties actually encountered and the means of their correction and removal. In this manner troubles arising from irregularities of feed supply in gasoline engines are treated in one chapter, while others are devoted to the subjects of starting, fuel consumption, ignition, timing, lubrication and condition of the engine as indicated by its noises. Very few illustrations are presented, the treatment of the subject being almost entirely descriptive. The work should prove of interest and benefit to the operator of a gas engine, especially if he is not thoroughly familiar with the principles of its design and construction.

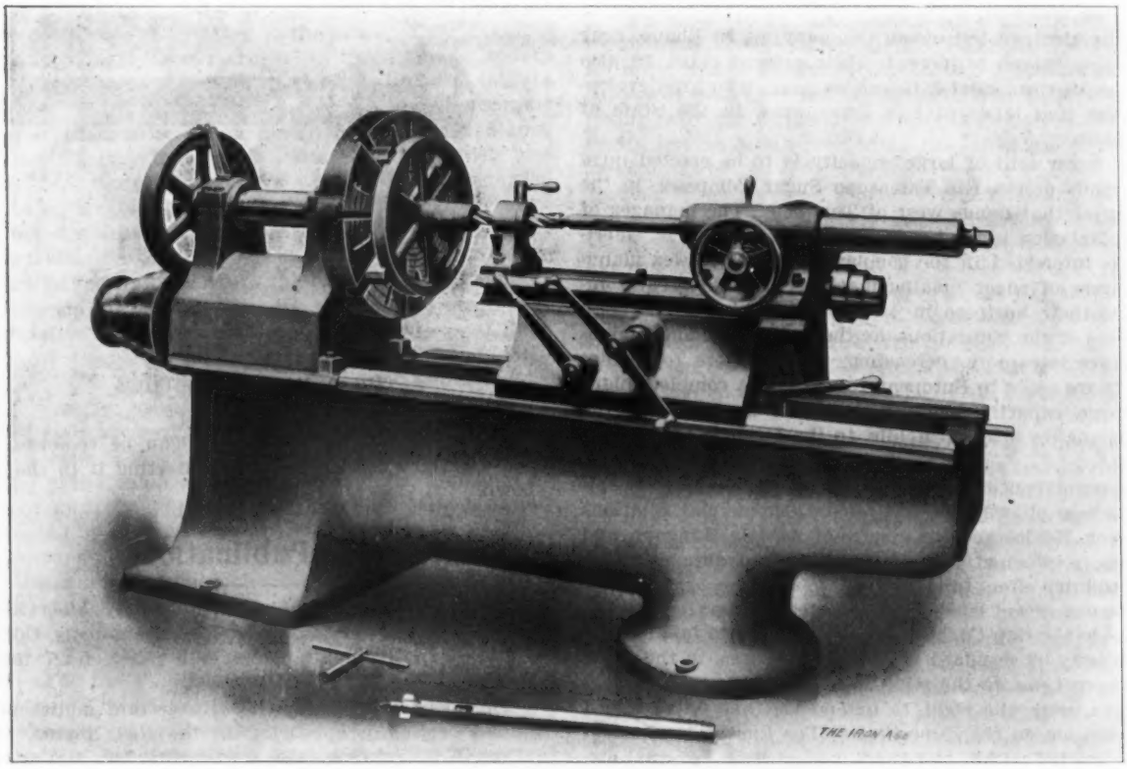
The Streit 36-Inch Boring Lathe.

A new type of boring machine, designed to perform all classes of boring produced on a turret lathe, has just been completed by the A. Streit Machine Company of Cincinnati, Ohio. At present the machine is built in only one size, which is capable of swinging work 36 inches in diameter. It will bore a hole 24 inches in depth.

The slide on the head shown in the engraving is moved backward and forward on its base like a turret slide, and has a range of 16 inches, allowing the machine to bore work from 1 to 16 inches in width without moving the base. The slide, it will be noted, carries a forward rest and the boring spindle.

When the work is chucked the slide is moved forward so that the rest to the boring bar is immediately behind the cutter when the cut is commenced. This insures a true hole, regardless of how much the core may run out of true.

The cutters and reamers fit in the end of the bar and are interchangeable without removing the bar. The bars can be forced out of the spindle by means of the plug shown at the end of the spindle, and they may then be drawn out at the side of the head.



THE STREIT 36-INCH BORING LATHE.

As an example of the performance of the machine it may be noted that the gear blank shown in the chuck of the machine illustrated herewith was chucked, bored and reamed in eight minutes. The hub of this blank is 8½ inches long. It is claimed that the same work can be done on this machine in one cut that will require two cuts with ordinary methods. By using two clutch pulleys on the countershaft eight spindle speeds are obtained. The diameter of the spindle is 4½ inches. The countershaft pulleys are 14 x 4¼ inches and run 300 and 450 revolutions. The weight of the machine is 3500 pounds.

Mephan Ferguson, the Australian engineer, the establishment of whose works in Staffordshire, England, was recently mentioned in *The Iron Age*, has also erected engineering and pipe works at Wanganui, New Zealand, in order to supply the town with 20 miles of his spiral riveted steel pipes for the water supply. Mr. Ferguson manufactures at Footscray, Melbourne, pipes of all sizes over 6 inches in diameter.

Canadians Suffer from American Competition.

TORONTO, November 7, 1903.—Two of the leading newspapers of this city are investigating the state of industry and trade throughout Canada, testing for depression. Each has published a series of articles embodying the reports of staff correspondents and interviews with manufacturers, bankers and other business men. The *News* notes evidences of actual decline and premonitions of a further slackening of trade. In several departments it finds no perceptible change, and in only a few does the situation appear to it to be already serious. But it takes rather a gloomy view of the future. The *Globe*, which is making a similar study of conditions, gives a more cheerful running account of them. In regard to one group of industries, however, the testimony of the two papers is much the same. Manufacturers of iron and steel and of many of the staple products of these materials are not making as much money as they were. They are more disturbed by competition.

Protection from the United States.

Speaking to the *Globe*, George E. Drummond, president of the Canadian Manufacturers' Association and of the Canada Iron Furnace Company, had this to say:

Business in Canada is prosperous at the present time, and our national development insures that prosperity for a considerable period, if only we can be guarded against unsettling and injurious influences from outside. The "flag of distress" is hung out in the United States, and a market must be found for her surplus products at all costs. Our only safeguard against being forced to share in our neighbor's depression lies in the immediate revision of our customs tariff. Given an efficient tariff, Canada will remain prosperous for many years to come.

This was published on the 5th inst. The next day Mr. Drummond was asked to state in a Montreal newspaper what products the United States was dumping on this market. He replied, as reported in that paper:

The Canadian market is at present overrun with drummers offering American pig iron at slaughter prices, concessions being readily made for export to Canada. The duty against this iron is $2.50 a ton. It should not be less than $3.50 a ton, the American tariff against Canadian pig iron being $4 a ton. American steel and iron products of all classes are now being offered to the trade at special cut prices for delivery in Canada. I would mention steel beams, plates, angles, channels and rivet

steel. These special lines are being offered for Canadian delivery at from 40 to 50 cents a hundred pounds less than the prices current at Pittsburgh.

From one of the representatives of the steel industry in Hamilton the *Globe's* inquirer learned that the effects of depression were already being felt there. Iron and steel were being offered by United States manufacturers at prices below those at which the Hamilton people can do profitable business. The latter see trouble ahead if the home market is not better protected.

Finished Products.

A. W. White of George White, Sons & Co., Limited, London, Ontario, is quoted by the *News*. The company manufacture thrashing machines, mowers, &c. Mr. White finds the 20 per cent. duty inadequate. "Were the duty lowered by 5 per cent.," Mr. White is reported as saying, "I would move our plant to Port Huron and sell the output to better advantage in Canada than I can do now." Rate cutting by United States competitors has already begun. But it is not by any means restricted to the most finished products. Material is also offered at reduced prices. Mr. White showed invoices to prove his statement that Canadian manufacturers were buying steel at cut rates from the United States, the said rates being lower than those current in that country. American steel, for instance, was sold to his company at a price 12½ per cent. below that holding across the line. Up to the last month or two Mr. White had, it appears, been buying his raw material in Canada and Great Britain. Now, to prevent himself losing money he must buy in the United States. Higher duties on the raw material would help Canadian producers, but compensating additions would have to be made to the protection of manufacturers using the material.

John Taylor of the Taylor-Forbes Company, Guelph, one of the largest concerns manufacturing general hardware in Canada, was one of the manufacturers interviewed by the *News*. He is a member of the Tariff Committee of the Canadian Manufacturers' Association. He said:

We have simply got to go out of business in some lines for next year. We are cutting down our staff and sailing very close to the wind in our orders for raw material. American goods are coming in at undervaluation prices, and Canadian firms are snapping them up in some lines at prices lower than we can possibly make them. One London firm write me that they are offered lawn mowers at $1.60 apiece. Laid down in Canada they cost about $2.10. It costs us $2.77 to manufacture them.

Like Mr. White, he remarked upon the demoralization of the market for raw material. American pig iron, he said, is offered at $2 below the lowest Canadian price, and American steel at a cut of 25 per cent. on the price that had been ruling in Canada. This is forcing him to buy across the line. Lower wages, Mr. Taylor insisted, are paid in Connecticut, where most of the United States hardware comes from, than in Canada. He said that during the past few weeks his company have had two or three applications per day from men thrown out of employment in the United States.

R. O. McCulloch, secretary-treasurer of the Goldie McCulloch Company, Galt, Ont., whose output includes engines, boilers, safes, vaults, wood working machinery and flour mill machinery, spoke to the same general effect. He said:

Up till a few weeks ago United States firms did not bother with the Canadian markets. They were too busy looking after their own market. But now they are invading our market, and if rates are cut to any extent our present protection is no protection at all. My attention has just been called to a large Toronto order that has gone to a United States firm, and the Executive Committee of the Engine and Boiler Makers' Section of the Canadian Manufacturers' Association has been called to meet in Toronto to consider what can be done to ward off the impending flood.

Prompt Delivery.

In Galt, Stratford and other manufacturing centers, travelers representing American houses are reported to be pushing business with the utmost keenness. They are said to be quoting prices much below those current at home, and to be offering prompt delivery as a special inducement to buy. Up to a short time ago no American travelers in certain lines had been seen here for years. Now they are becoming numerous and are very energetic. In the stove trade of the Canadian West American makers are making rapid headway. Into that part of the country, indeed, a very large volume of products of iron and steel of all kinds is being poured. The West has had a good crop and is receiving fair prices. This year's produce there should have a buying power of $50,000,000. C. A. C. J.

The Philadelphia Foundrymen's Association.

The one hundred and thirty-second meeting, being also the twelfth annual one, of the Philadelphia Foundrymen's Association was held on Wednesday evening, November 4, at the Manufacturers' Club in that city. The president, Thomas Devlin, occupied the chair. Among those present were the following:

Thomas Devlin, Thomas Devlin Mfg. Company.
E. E. Brown, E. E. Brown & Co.
D. G. Moore, Elizabeth, N. J.
P. D. Wanner, Reading Foundry Company, Reading, Pa.
Thos. B. Harkins, Harkins Foundry Company, Bristol, Pa.
J. Thompson, J. Thompson & Co.
Thos. J. Kelley, Thomas, Roberts, Stevenson Company.
W. J. W. Moore, Pilling & Crane.
W. E. Arnold, L. & R. Wister & Co.
C. D. Matthews, Camden Iron Works.
H. O. Evans, Thos. Devlin Mfg. Company.
Geo. C. Davis, chemist, Philadelphia, Pa.
H. L. Haldeman, Pulaski Iron Company, Philadelphia, Pa.
A. G. Warren, J. W. Paxson Company.
W. H. Shelmire, Jr., Creswell & Waters Company, Philadelphia, Pa.
S. J. Creswell, Creswell & Waters Company, Philadelphia, Pa.
A. A. Miller, *The Iron Age*, Philadelphia, Pa.
A. D. Wallace, R. E. Brown & Co., Philadelphia, Pa.
C. R. Brown, R. E. Brown & Co., Philadelphia, Pa.
F. M. Etting, E. J. Etting, Philadelphia, Pa.
R. O. Oliphant, Trenton Malleable Iron Company, Trenton, N. J.
W. O. Steele, Bateman Mfg. Company, Grenloch, N. J.
Augustus Williams, Enterprise Mfg. Company.
Jas. H. Ritter, Biddle Hardware Company, Philadelphia, Pa.
W. A. Devlin, Thos. Devlin Mfg. Company.
H. Huder, Schaum & Uhlinger.
W. T. MacDonald, Schaum & Uhlinger.
F. J. Potter, E. J. Etting.
Alex. C. Groome, Bethlehem Steel Company.
H. L. Tripple, Standard Scale & Supply Company, Philadelphia, Pa.
Wm. O. Thompson, National Specialty & Mfg. Company, Philadelphia, Pa.
H. J. O'Neill, Philadelphia Hardware & Malleable Iron Works, Philadelphia, Pa.
Jas. J. Devlin, Thos. Devlin Mfg. Company.
Herrick Haspel, Thos. Devlin Mfg. Company.
Chas. F. Link, Thos. Devlin Mfg. Company.
Harry Drinkhouse, Thos. Devlin Mfg. Company.
F. Cooper Pullman, J. Wesley Pullman, Philadelphia, Pa.
S. B. Gibbons, J. Wesley Pullman, Philadelphia, Pa.
W. A. Perrine, Abram Cox Stove Company, Philadelphia, Pa.
J. Haag, North Wales Foundry Company.
Howard Evans, J. W. Paxson Company.

The treasurer reported a balance of $1949.61 on hand with all indebtedness paid. The election of officers for the ensuing year followed. There being no further nominations than those proposed at the last meeting, the secretary, on motion, cast the unanimous ballot of the association in favor of the nominees. The following officers were declared elected for the year 1903-1904:

President, Thos. Devlin, Thos. Devlin Mfg. Company, Philadelphia; vice-president, A. E. Outerbridge, Jr., Wm. Sellers & Co., Philadelphia; treasurer, Josiah Thompson, J. Thompson & Co., Philadelphia. Executive Committee, H. O. Evans, Thos. Devlin Mfg. Company, Philadelphia; Thos. M. Eynon, Eynon-Evans Mfg. Company, Philadelphia; R. C. Oliphant, Trenton Malleable Iron Company, Trenton, N. J.: E. E. Brown, E. E. Brown & Co., Philadelphia; T. B. Harkins, Harkins Foundry Company, Bristol, Pa. Trustees, Thomas Devlin, Josiah Thompson and Howard Evans. Official chemist, George C. Davis, 39 South Tenth street, Philadelphia.

Under new business, the question of forming a quiz class for the purpose of taking up questions of interest to foundry practice was discussed, but in the absence of those familiar with the matter action was deferred. The association, by unanimous vote, placed itself on record as favoring the proposed 35-foot minimum depth channel for the Delaware River and harbor, and urged its adoption.

In a discussion of the condition of the foundry trade,

it was the consensus of opinion that trade was not showing much improvement. There has been a falling off of new business in many instances, and buyers are demanding lower figures for castings, which in some instances has been acceded. There is little encouragement in sight as far as the immediate future is concerned. In the matter of pig iron costs, it was said that many furnaces are now selling iron below cost, but that even present figures would probably work lower. Large buyers have been afraid to take hold in anticipation of reductions, and will not purchase actively until it is fairly certain that bottom has been reached.

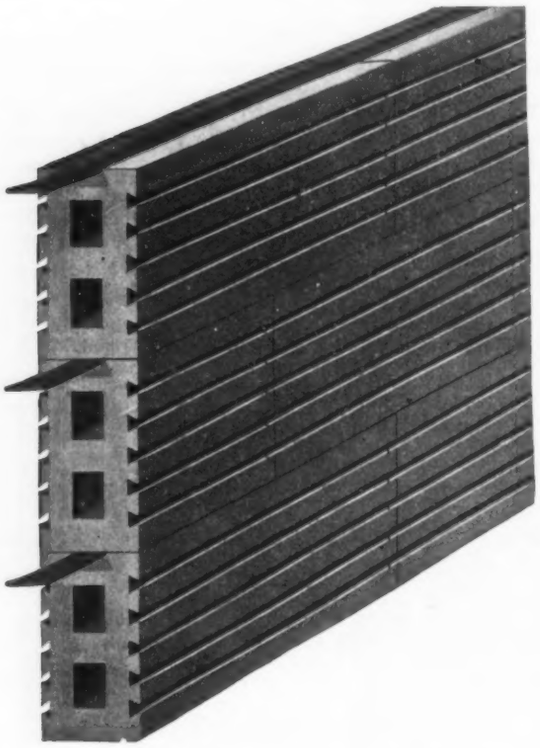


Fig. 1.—Section of Wall of Phœnix Hollow Tile.

The paper before the association for the evening was on the subject, "Penn and His City," by James H. Ritter of the Biddle Hardware Company, Philadelphia. The paper was illustrated by some 50 lantern slides, and was very interesting from historical, commercial and descriptive points. Mr. Ritter was tendered a vote of thanks at the conclusion of his entertaining paper. The association then adjourned, and the usual lunch was served on the roof garden of the club.

The Phœnix Hollow Tile for Wall Construction.

Henry Maurer & Son, 420 East Twenty-third street, New York City, are introducing a new substitute for common bricks in the construction of walls for factories, warehouses, power plants, &c. This substitute is Phœnix hollow tile, which may be made in any reasonable shape or size, and fitted with grooves upon either or both faces, for use in connection with such type of interior or exterior finish as may be necessary. The tiles are of hard burned terra cotta, commonly made in blocks 4 inches thick, 8 inches high and 12 inches long, this size weighing 16 pounds per block. In Fig. 1 is shown a section of partition wall made up of these blocks, with both faces grooved for plaster finish. The top and bottom edges of the blocks are recessed longitudinally to receive strips of 1-16 x 1 inch band iron, imbedded in mortar and serving as bonds between the several courses. Walls of these tiles are intended to be arranged in vertical sections of from 12 to 16 feet in width, the sections being separated by vertical I-beams, between whose flanges the several wall sections are fitted and built up.

Fig. 2 shows the buildings of the Barber Asphalt Paving Company, at Maurer, N. J. In these buildings the Phœnix tile has been used, as also by the American Smelting & Refining Company in their recent constructions at Perth Amboy. The bonding bands are supposed to be riveted at their extremities to the I-beams separating the sections of the wall, thus effectively insuring great lateral strength. It is believed that a wall of these blocks 4 inches in thickness, strengthened by 6-inch I-beams spaced 16 feet apart and with the bonding bands properly riveted, is the equivalent in strength of an ordinary 12-inch brick wall as usually constructed. The

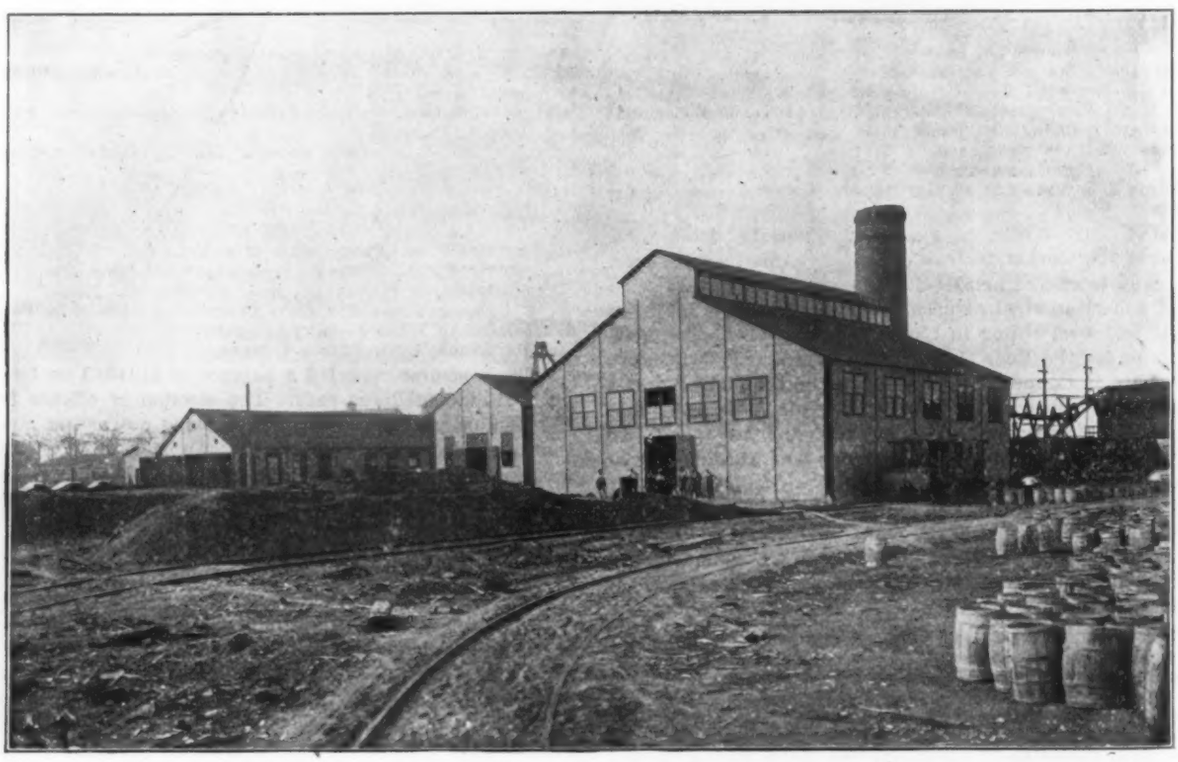


Fig. 2.—Phœnix Hollow Tile Construction.—Barber Asphalt Plant, Maurer, N. J.

THE PHŒNIX HOLLOW TILE FOR WALL CONSTRUCTION.

air spaces in the hollow blocks increase the nonconductive qualities of the wall, and are held to make the 4-inch Phœnix wall practically the equivalent, in this respect also, of the common 12-inch brick wall.

While the Phœnix wall is thus believed to be comparable in strength and nonconducting qualities to the 12-inch brick wall, great savings are made both in weight and cost in favor of the hollow tiles. The weight per square yard for 4-inch thickness of Phœnix wall is given as only 216 pounds, including I-beams and bonding bands, as against 760 pounds per superficial yard for the 12-inch brick wall. Comparison of these figures shows material economy for the tiles, this difference of weight constituting a considerable saving in costs of freight and cartage, especially where material has to be transported great distances. It is stated that the cost of the Phœnix wall is fully one-third cheaper than that of its equivalent brick wall. The greater size of the tile also contributes to rapidity of construction, as compared to the ordinary small brick.

For roofs, as an auxiliary to the red clay roofing tiles of the interlocking type, as manufactured for some time past by Henry Maurer & Son, this firm have just introduced transparent tiles of tough glass, made of the same size and form, so as to be interchangeable with the clay tiles. Use of these glass tiles in sections of a roof does away with the necessity for special skylight arrangements, besides providing for increase or decrease of lighting areas in the roof at small expense. The avoidance of skylight difficulties is a point of interest to builders and owners, as the maintenance of these features is an item of importance as involving frequent inconvenience and expense. Many pretty effects may be secured by varied arrangements of the glass tile units among the clay ones in the roofs of railway train sheds and similar structures.

A Vote on Limit of Output Being Taken.—At a meeting of the Independent Sheet Manufacturers' Association, held in Pittsburgh, Pa., on Tuesday, October 27, it was decided to make a demand of the Amalgamated Association that the limit of output in union sheet mills, which sign the Amalgamated scale, be removed. This demand was made, and it was pointed out to the officials of the Amalgamated Association that it was utterly impossible for the union sheet mills to compete for trade in the open market with nonunion sheet mills in which the limit of output did not exist. Such a strong argument was made in favor of the removal of the limit of output that the Amalgamated Association officials decided to submit the matter to the various lodges for a vote, and this vote is now being taken. The result of it will be known in a few days, and it is expected will be in favor of the limit of output being removed. In case this is done the position of the union sheet mills which sign the scale will be considerably strengthened. In the event of it being refused, it is not improbable that a number of union sheet mills will follow the action of the Stark Rolling Mill Company, at Canton, Ohio, and will operate their plants on a nonunion basis, without regard to limit of output.

It has been announced that the Dominion Coal Company have in contemplation plans for a stupendous increase in the coal output from their collieries within the next two or three years, which will mean increased shipping facilities and an improved transportation service. It is said that this is the mission President Ross, who is accompanied by Austin King of Philadelphia, is on. Mr. Ross and Mr. King have been in consultation with the head local officials of the company ever since their arrival. It is proposed to open two or three more mines to be operated through slopes, and equip the present ones with new machinery and new appliances for an increase. When these improvements are effected Mr. Ross expects to increase the output from 3,000,000 tons a year to 4,500,000 tons, and this will be gradually increased until it is brought up to the 5,000,000 mark. Operations looking forward to these developments will be begun early next year. They will mean that the employees will be increased to 7000, and that the yearly wage list will be increased to $5,000,000. The company will charter a fleet of steamers and cater to the home, American and European markets.

OBITUARY.

James Armitage, president of the Armitage-Herschell Company of North Tonawanda, N. Y., manufacturers of engines, boilers and machinery, died October 21, from pneumonia, at his home in North Tonawanda, aged 62 years. Mr. Armitage was born in England and came to America in 1864, engaging in business in Buffalo and Williamsville, until 1872, when he founded the company with which he was connected at the time of his death.

H. Chester Crouch, professor of mechanical engineering at the University of Colorado, died October 29 at his home in Boulder, Colo., from typhoid fever, at the age of 32 years.

David Haas, for 30 years the proprietor of a foundry and machine shop in Mahantonga Valley, Pa., died October 23, at his home near Shamokin, Pa., aged 63 years.

Joseph W. Fiske, president of the J. W. Fiske Iron Works of New York, died October 20, at his residence in East Orange, N. J., at the age of 73 years, after a protracted illness. He began business in New York in 1858, but retired from active work 15 years ago. Mr. Fiske was a native of Boston, Mass.

Samson Fox, chairman of the Leeds Forge Company, Leeds, England, died October 24, at Walsall, England, after a short illness. Mr. Fox recently returned to England after a brief visit to this country to investigate the development of the pressed steel car industry, which he originated at Joliet, Ill., several years ago by the erection of a plant for the construction of the Fox car truck.

Mrs. Louise C. Bartlett, president of A. F. Bartlett & Co., foundrymen and machinists, of Saginaw, Mich., died October 26, aged 60 years. Mrs. Bartlett was actively connected with a number of other industrial enterprises in Saginaw.

Levi Carter, president of the Carter White Lead Works, of Omaha, Neb., died November 8 at his home in that city.

R. B. Turner, member of the American Society of Mining Engineers and superintendent of the Kearsarge mine at Summit, Mont., was killed November 6 in his endeavor to save the lives of his men in a burning shaft of that mine. Mr. Turner was an authority on cyaniding.

Clinton Burnham, president of the Clinton Burnham Foundry Company, Milwaukee, Wis., died October 28 from dropsy, aged 42 years. He was born in Milwaukee, and after attending the public schools in that city took a course at Markham's Academy, and then went to Notre Dame College, Notre Dame, Ind., where he graduated. He entered the brickyards owned by his father, and in 1890 was made a member of the firm of J. L. Burnham & Sons Company. At his father's death, in 1892, Clinton, with his brother, John F., carried on the business until it was leased in 1899. Clinton Burnham then organized the foundry company bearing his name. He is survived by a widow.

The American Boiler Manufacturers' Association is now in session at Chattanooga, Tenn. John O'Brien of St. Louis is president. Considerable business of importance is scheduled for consideration at this convention. It is regarded as probable that the association will for the first time take action on the labor question, with a view to counteracting the aggressions of the unions in the shops of the members.

It is said that the Wabash Railroad has practically secured an entrance into Youngstown, Ohio. Henry Wick and other large local land owners have recently transferred to the Wabash considerable ground which is believed to assure the entrance of this road into the Youngstown district and connections with the various manufacturing plants.

A Blast Furnace with Continuous Flow of Metal.

The difficulty of handling the enormous mass of iron produced each time a modern blast furnace is tapped has led to the introduction of various types of casting machines. In general these have not proved very successful on account of their complicated construction, and casting in sand is still the most commonly employed method.

The invention of Thos. Stapf, a director of the Ternitz Steel & Iron Works, Ternitz, in Lower Austria, patented in all important manufacturing countries, may perhaps overcome the difficulty. He removes both iron and slag as fast as formed automatically, continuously and separate from each other, and thus facilitates the subsequent handling. This object is attained by arranging at suitable hights in the hearth openings in such a manner that:

1. Slag cannot reach the tuyeres.
2. The blast cannot escape.
3. Slag can pass only through the upper opening.
4. Metal can pass only through the lower opening.

The first condition is fulfilled by the mouth of the cinder notch being at a lower level than the tuyeres. The second point is arranged for by the cinder notch sloping up toward the exterior, the hight, h_2, Fig. 1, being arrived at by a simple calculation. The third point is gained by making the exit of the iron notch sufficiently high above its entrance to insure that the column of molten metal shall counterbalance the slag and the pressure in the furnace. The fourth point is assured if care is taken that h_3 is greater than h_1, Fig. 1. Ob-

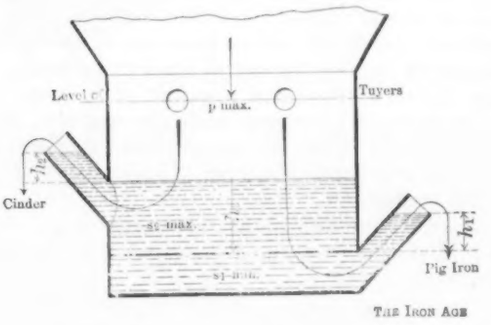


Fig 1.—*Arrangement for Continuous Flow.*

viously, the iron notch should be placed as low down as possible.

That the new invention has practical advantages is proven by experiments made at the Trofaiach blast furnace by the inventor and A. Bratke of Trofaiach, Styria, who writes of the same in *Stahl und Eisen.*

The fact that the labor of breaking up the pig iron is done away with is in itself an enormous advantage. Further, with the present system, on account of the tapping out periods getting out of time and the irregularity of the product, it is not easy to obtain for the steel works a sufficiently regular supply except by the use of an expensive metal mixer. If the latter proves necessary with the new system it will be smaller, simpler and more compact than is now customary.

Further advantage is gained by the better working of the furnace when equipped with the new invention. A furnace using the old method of tapping at intervals takes its burden in a very irregular manner, which in turn leads to hanging, slips and irregularity of product. By using the continuous method these troubles would doubtless disappear, as the uninterrupted flow from beneath would cause an equally gradual movement throughout the furnace. Further, the fact that the molten iron is removed as made, instead of standing for hours in the furnace, leads to a decrease in the consumption of coke, an increase of production and greater regularity of quality. Owing to the possibility of sampling the metal at any minute, it is easier to counteract any threatened disturbance. This fact alone makes this process valuable, even when, on account of the direct process being used, large quantities of molten metal are required at intervals, although in this case a mixer is necessary. Another gain is that it is unnecessary to slow down the engines when tapping or to blow out the iron notch afterward.

The principal advantage of the new method seems likely, however, to lie in the fact that all casting and loading machinery can be on a much smaller scale than formerly, owing to the same being in use continuously instead of at intervals, which fact will doubtless tend to overcome the prejudice existing among practical men against pig casting machines.

The method of carrying the new arrangement into practice will vary with local conditions. It will be advisable to make the slag opening large, by doing which easy access can be obtained to the interior of the furnace, and some of the advantages of the old style open furnace are regained. The openings for slag and metal should be opposite each other; firstly, to facilitate working around the same, and, secondly, in order to be able to reach the inside of the iron notch with a bar inserted in the slag opening.

Iron and slag notches in the usual positions should be provided, so that all molten metal can be run off if desired and also in order that in case of need the furnace can be run in the usual manner. This reserve tap hole is especially useful when blowing in a furnace or restarting it after a prolonged period of inactivity, as considerable uncertainty may exist at those time as to the hight of the molten materials within. The latter is important, because if the iron notch is opened before sufficient metal has come down to allow the continuous flow to begin the metal would remain so long in the passage that great danger would exist of its solidifying there. In order to protect the brick work, it is advisable to use water cooled iron or bronze blocks at the metal and slag openings.

The sketches indicate sundry variations of the system to suit varying conditions. Fig. 2 shows the ar-

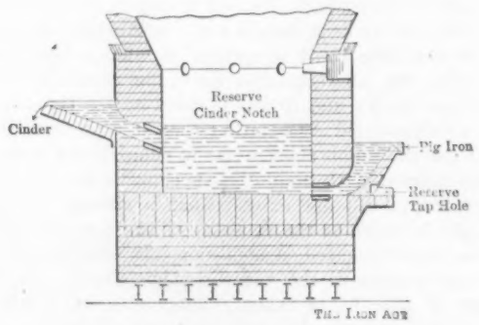


Fig. 2.—*To Pig Casting Machine.*

rangement when the iron flows from one side direct to the pig casting machine, while from the other the slag flows into the cinder cars. Fig. 3 shows the case where

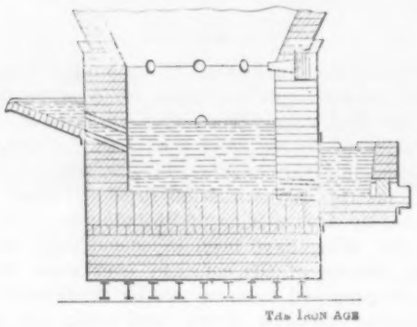


Fig. 3.—*Iron Forehearth.*

the iron notch is expanded into a small "fore hearth," whence the iron flows to the pig machine and from which also small quantities can be tapped or dipped from time to time for foundry or other purposes. This arrangement is convenient when it is desired to run off the metal

in more than one direction. Fig. 4 shows an arrangement whereby the metal flows into a gas heated chamber, whence it is taken as wanted for the steel works or elsewhere.

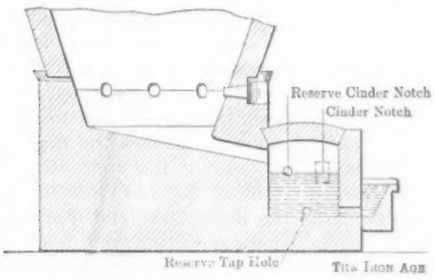


Fig. 4.—Gas Heated Iron Chamber.

In this chamber it may, if desired, be subjected to a preliminary refining process. Fig. 5 shows a continuous flow furnace with the hearth as small as possible, for

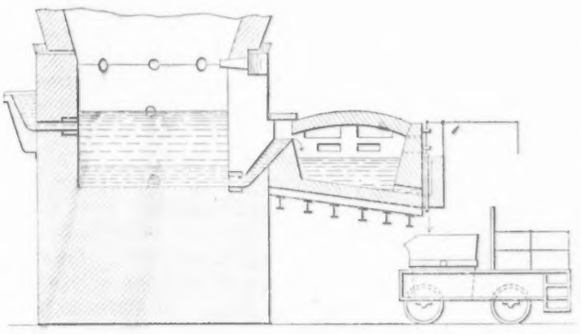


Fig. 5.—Continuous Flow Furnace.

the double purpose of diminishing the cooling surfaces and of removing the molten metal rapidly.

From the above it may be seen that Stapf's patent may not only be applied to new furnaces at a small cost, but may also be added to existing ones during a very short shutdown. The latter operation was carried out at the Trofaiach furnace, an old fashioned stack producing some 30 to 35 tons a day, with very limited room at the base, and in spite of the adverse conditions it proved successful, although owing to the lack of experience and the bad condition of the furnace it was not possible to run the new method for long. The furnace is now being rebuilt, after which the experiments will be resumed, for which purpose the hearth is being arranged so that the iron flows to the left to the casting arrangement (run by one laborer), and the slag to the right, where it undergoes the process of granulation. The German author promises to publish the results of future experiments, regarding the successful outcome of which he professes to have no doubt.

Trade Publications.

Barrel Machinery.—An interesting catalogue has been received from the Trevor Mfg. Company of Lockport, N. Y., makers of machinery for shingles, barrel heading and slack barrel staves. The Trevor standard sawing machine is adapted to a wide range of uses. Its capacity per day ranges from 20,000 to 40,000 shingles, 8000 to 15,000 pieces of slack heading or orange box ends, or from 4000 to 7000 pieces of tight heading, varying with the skill of the operator and the quality of timber. The saw enters at the upper corner of the block and has to cut the grain of the wood but once, and consequently keeps sharp much longer than would be the case if it entered the side and cut the grain twice, as in horizontal machines.

Interior Telephone Systems for offices, factories, schools, residences, hotels, &c., are manufactured by the Holtzer-Cabot Electric Company of Boston, Mass. Their system requires no expensive and complicated switchboard, and the service is quicker, more privated, and less expensive than those which involve the employment of an operator. The following illustrates the convenience: The user rotates a switch arm to the contact corresponding with the station desired and presses the button, signaling the individual at the required station without disturbing any of the others. The person signaled removes his receiver and conversation begins at once.

Carborundum.—An account of the manufacture and development of carborundum at Niagara Falls by the Carborundum Company is contained in a late catalogue, which also enumerates the characteristics of carborundum and the many uses to which it may be put as an abrasive.

"Lightning Protection" is the title of the latest circular by the Westinghouse Electric & Mfg. Company of Pittsburgh. The proper function of a lightning arrester is to prevent, in an insulated circuit, an abnormal rise of potential above the earth. This result is best attained by placing one or more carefully adjusted air gaps between the insulated circuit, commonly called the "line," and the earth connection, or "ground." Except during times of discharge, these gaps resist any flow or current arising from the normal voltage of the line; but whenever the line potential rises abnormally, they break down, allowing a free discharge of electricity. By careful adjustment of the gaps, an arrester can be made to discharge when the voltage of the line has risen to any predetermined value.

"Power and Transmission," heretofore published as a quarterly by the Dodge Mfg. Company of Mishawaka, Ind., will, in the future, be issued monthly. This change will be welcomed by all who are interested in power transmission.

Steam Pumps.—A large catalogue has been prepared by the American Steam Pump Company of Battle Creek, Mich., descriptive of the Marsh steam pumps, adapted for every service. Their standard boiler feed pumps have capacities ranging from 150 to 1500 horse-power. The base is cast hollow, forming a suction chamber, to which the suction pipe may be connected on either side. To this base the steam and water cylinders are firmly attached, both overhanging. This construction admits of a ready interchange of cylinders on either side, so that any required combinations can be made.

Detachable Link Chain.—We are in receipt of a handsome 128-page catalogue, No. 2, issued by the Michigan Sprocket Chain Company, Limited, Detroit, Mich. This company are manufacturers of standard detachable link chain belting, special styles of extra heavy chain belt, malleable iron buckets, sprocket wheels, elevator arms, &c. Considerable space in their catalogue is devoted to illustrations of various styles and sizes of link chain belting, which may be said to be their specialty. Attachments used in the employment of chain belting for different purposes are also shown, including carriers for sawdust, coal, broken stone, ice, log hauls, &c. The catalogue also embraces the minor specialties of the company's manufacture, particularly sprocket, triple and traction wheels, elevator buckets and coal and ore conveyors. Illustrations are in half-tone from wash drawings, printed on rich plate paper.

A pamphlet by Yale & Towne Mfg. Company, 9 Murray street, New York, contains many hints for hoisting with their triplex blocks.

The Chicago Pneumatic Tool Company, Chicago, have issued special circular No. 43, covering a number of their devices. Particular attention might be called to the Caskey punch, which is a special machine made for special work and which is said to combine among its advantages portability, speed, accuracy, lightness of weight and convenience. Another machine which is shown on the folder, and should be of particular interest to all, is the Christensen motor driven air compressor. This motor is meeting with great success in the equipment of street railway systems. The machines are manufactured in capacities from 7.5 to 1000 cubic feet of free air per minute and are designed for either stationary or portable use. They can be automatically controlled so as to maintain a constant pressure, and all parts are interchangeable and therefore readily accessible.

Cutter heads of every description for wood working machines are described in a large catalogue by Samuel J. Shimer & Sons of Milton, Pa.

Railroad journal boxes are considered in a new catalogue by the T. H. Symington Company of Baltimore, Md.

The Perkins Electric Switch Mfg. Company, Bridgeport, Conn., have issued a large catalogue dealing with the wide line of electrical supplies manufactured by them.

Stationers' goods and office supplies—files, boxes, copying rolls, trays, cases, &c.—made by the Globe-Wernicke Company, Cincinnati, are described in a new catalogue.

A catalogue from the Akron Electrical Mfg. Company of Akron, Ohio, describes their dynamos, which are noticeable for the accessibility of brush holders and commutator, and the compact and efficient hand wheel brush moving device. All unnecessary features are eliminated and the essential points of electrical construction brought to their highest perfection.

Mountney & Co., Limited, engineers, Sydney, Australia, have started a shipbuilding and repairing yard. Nothing so pretentious as ocean going steamers can as yet be built in Australia, we are advised, but local yards are kept fairly busy on harbor passenger steamers, tug boats and small coasting craft.

New South Wales railways for the year just closed show a loss of £426,000, and the Government tramways lost £19,300. This was principally due to the drought, the excessively low rates adopted for carrying starving stock, &c., and the entire absence of the usual wool and wheat traffic.

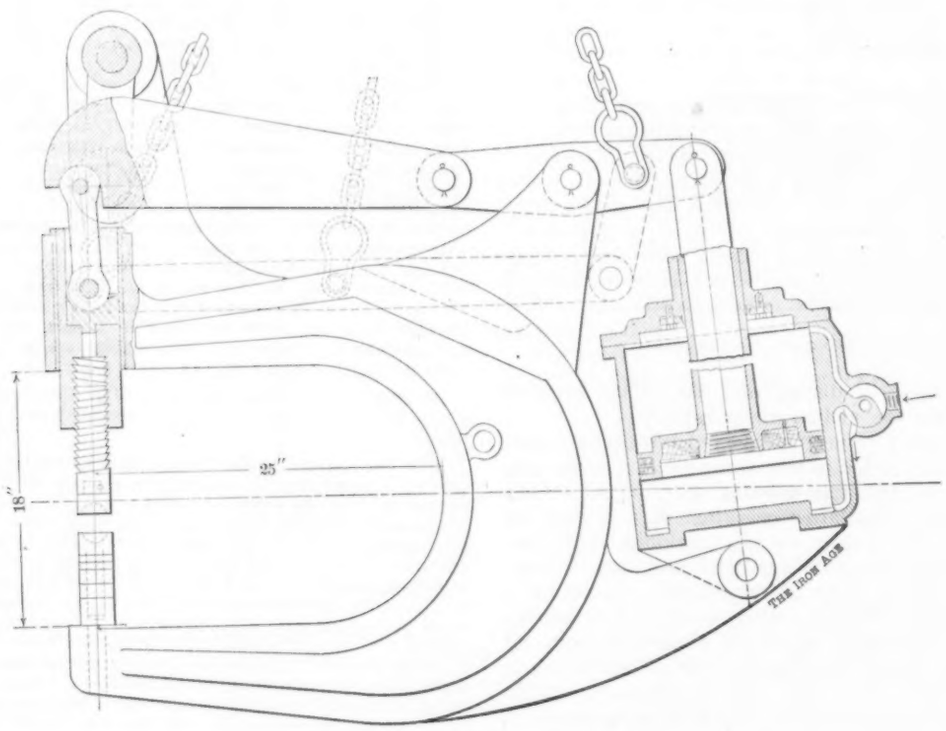
The Hanna Toggle Lever Pressure Riveter.

The advantages of the toggle joint for quick and wide opening of the dies and the superiority of the lever for greater range of movement at maximum pressure are combined in an interesting manner in the Hanna riveter, of which an illustration is presented herewith. The engraving shows a 25-inch machine, having 18 inches total jaw opening. The construction is evident from the drawing, and the operation may be made clear by a brief description.

The power cylinder is shown with the controlling valve at the rear; in the actual machine, as seen in the photograph, the valve and ports are at one side, bringing the operating handle within easy reach of the attendant while he stands in full view of his work. The inlet and outlet openings are indicated by the arrows. The working stroke of the piston is downward and the valve is shown in position for this down stroke, admitting the actuating fluid above the piston and allowing exhaust from beneath. Upon completion of the working stroke a movement of the valve through somewhat less than 90 degrees closes the outlet, cuts off admission and places the upper and lower ends of the cylinder in communication through their respective ports. The pressure in both ends of the cylinder thus quickly equalizes, and the piston is driven upward by the excess of total pressure upon its greater lower area. Reaching the upper end of the cylinder, the piston is held there until manipulation of the valve permits exhaust from below and allows admission above for another working stroke. The piston is a simple casting with a hollow trunk stem, to the forked upper end of which the working mechanism is attached. The cylinder oscillates to accommodate the lever movements, being supported with the required freedom by pin connection to bracket arms upon the jaw frame.

The moving die head or plunger is hung in a manner clearly shown in the engraving, the connection including essentially two toggle links, but with their adjacent ends offset from each other instead of being coincident. This offset enables the introduction of the lever principle, the leverage being here 12 to 1 between the power end of the main lever and the offset. The mechanism is shown in the position of maximum effect, and it is evident that through a considerable range of movement either way from this position the variations from this maximum can be but slight. It is stated that the portions of the mechanism in this machine are such that the maximum effect is exerted through a range equivalent to ½ inch of movement of the die. The importance of this feature, of course, lies in its provision for giving equally good and uniform work, regardless of the unavoidable variations in temperature and lengths of rivets, in thickness of plates and in sizes of rivet holes.

Wide opening of the dies is effected by the movement of the toggle links as the piston rises to the top of the cylinder. When the piston reaches the upper end of its stroke the lever bar joining the stem to the main lever rotates through 45 or 50 degrees from the position shown, thus bringing the main lever end down between the bracket supports, where the jaw frame is recessed to give the needed clearance. This movement draws the main lever bodily to the right, rotating the upper toggle link through about 25 degrees and causing a corresponding rise of the die plunger. In setting a rivet, then, the dies are brought to working position by the closing of the toggle, the greater portion of the actual upsetting of the rivet being done by the action of the lever and with but little movement of the toggle links after the point of heavy pressure is reached.



HANNA TOGGLE LEVER PRESSURE RIVETER.

For ordinary work the machine may be suspended by means of the hole through the jaw frame at the throat. For underneath heading of rivets, which must be inserted from above into stationary work, the chain suspensions may be used, and the whole machine thus caused to rise and fall by its own operation, and in such a manner as to make the lower die move to and from the work, while the upper one remains at rest. A double suspension is shown by the full lines, there being two chains attached to the grooved extremities of the plunger toggle pin, as shown, while a third is connected to a point of the mechanism at the rear having the proper vertical movement. A single suspension is arranged by use of connecting bars and links, as indicated by dotted lines, the points of attachment being the same as before.

Careful attention has been given to proper selection and distribution of materials in designing the various details of the machine, as well as to convenient arrangement of adjustment devices and other points of construction. The riveter is one item of the product of the Hanna Engineering Works, 820 Elston avenue, Chicago, Ill.

The inspection and testing of all the steel work entering into the construction of the large new Chicago freight

depot of the Baltimore & Ohio Railroad Company will be carried out by the American Bureau of Inspection and Tests of 930 Monadnock Block, Chicago.

The Bituminous Coal Trade.

BY F. E. SAWARD.

Whatever may have been the position of the consumer during the winter of 1902-3, he has had the best of the coal situation during the past five months. By the consumer is meant that large class making use of fuel for steam or general manufacturing purposes. The very high prices of all grades during the winter were caused by the short supply of anthracite. At times up to $5 a ton at the mines had to be paid for bituminous coal, and some of it of indifferent quality at that. This extraordinary condition of affairs could not be expected to continue for any length of time after the production became normal. It was the expectation, however, among some of the producers of soft coal at the mines supplying the trade east of the Alleghanies that a better price than ruled in 1902 could be had. They were led on to this idea by the increased rate of tolls to be paid to the carrying companies, and also the increased wages paid for mining from April 1, both these items perhaps being largely due to the very high figures of the preceding winter. Therefore a schedule was formulated which gave the shippers of soft coal quite a generous advance over the rates of 1902. But consumers took the coal sparingly under these circumstances, and the shippers who had the lower grades of coal were more numerous and more active in pushing for business. This resulted, of course, in the higher priced coals being neglected to a degree. There was also a great deal of what is known as shipping "on the market." This was another benefit to the buyer, and it was duly and fully taken advantage of. The course of the soft coal business has therefore been not what the shippers had looked for, and some tonnage has been disposed of at less than cost of production. A great deal of tonnage was placed during September on the basis of $1.10 per ton at the mines, as against an agreed on price of $2 per ton.

In view of all this, there has recently been an effort to ameliorate conditions from the producer's standpoint. The whole situation has been thoroughly discussed, and the upshot of it all is that there will be temporary shutdowns at the collieries in order to bring values up to something like the scale originally proposed, for the two items of increased tolls and wages must stand. The cessation of operations will not seriously affect the higher grade tonnage, as that had been curtailed before by the increased efforts of owners of the cheaper coals to put their stocks into the market; but it will tend to eliminate very largely these cheaper grades and reverse the position, the producer being independent and not compelled to accept the price offered by the purchaser in order to relieve cars or vessels. One may be able to get all needed supplies, but hardly at the abnormally low figures which prevailed for some tonnage which was marketed during August, September and October. An agreement to work only four days a week, and hold prices at $1.50 at the mines, is now in order.

The prices set at the opening of this year's contract season were as follows:

At Greenwich, Philadelphia, f.o.b., Clearfield, Beech Creek, Meyersdale, Fairmont and Davis small vein, $3; Cumberland and Elk Garden, $3.35.

At Baltimore, f.o.b., Clearfield, Beech Creek, Meyersdale, Fairmont and Davis small vein, $2.93; Cumberland and Elk Garden, $3.30.

At Newport News, f.o.b., Chesapeake & Ohio, $3.15.

At Norfolk, f.o.b., Norfolk & Western, Pocahontas, $3.15.

How they have been more honored in the breach than in the observance every buyer of coal knows only too well from the opportunities offered as above noted.

The Bituminous Coal Tidewater Association, whose members had practically determined to make a reduction of from 50 to 60 cents a ton in the prices fixed last April, have reconsidered that action. The programme as revised is for the various operators in the association to maintain the April price as far as possible. To make an official reduction from the April prices, it is said, would seriously affect existing contracts, which under their terms require that any reduction will apply equally to any portion of the contract uncompleted at the time of such reduction. Furthermore, it is argued that any reduction in the prices made now would have to be borne entirely by the operators, as both the wage scale and the freight rates are fixed for the year, and no concession in that direction can be expected. By waiting until next April, when the 1904 prices will be fixed, it is confidently believed that, unless conditions change very materially, both the railroad and labor situation will co-operate toward lower prices. In the meantime if the operators stand firm on the basis as outlined it will mean an advance of from 50 to 60 cents a ton over the summer's open market prices. So far as market conditions are concerned it looks very much as if the matter of price has little or no effect, and it is questioned by some whether an official reduction would be sufficient to galvanize life into a trade that has been dull and almost lifeless all summer. The relief must come from the reduction of the available tonnage.

With the approach of cooler weather there will be a much greater use of soft coal for other than industrial purposes, and this will tend to stiffening of values; there is a large area of country where bituminous coal is used for heating purposes, and this takes away a lot of coal that otherwise would be thrown upon the market for use in industrial purposes. Prices during the past week have kept at $2.40 and $2.50, at New York harbor, with about $2.65, f.o.b. at Hampton Roads points; the latter ports are said to be very much busier than they were a fortnight ago. Conditions in the all rail trade are little changed, a curtailing of shipments to one place being offset by an increase to another. Some small reductions are reported in the prices named at certain all rail points, but these reductions do not seem to have any very great effect in increasing the tonnage wanted.

Free Coal.

The New England manufacturer is vitally interested in the continuance of "free coal;" the duty was suspended on January 15, 1903, for the term of one year, owing to the short supply of American coal of all kinds during last winter; the receipts at Boston alone amounted to 790,000 tons in the first four months of this year, and while perhaps the duty did not figure very strongly, the possibilities of foreign supplies were a feature not to be disdained. Nova Scotia will no doubt continue to send a large tonnage to the New England ports, as she has always done, for there are many good coals mined there, and the cost is not much beyond that of American coal, duty or no duty. As the conditions in American mining change, we look for an extended trade to upper Canada, to replace the loss in New England, inasmuch as nearly all of the increase in the importations of coal in the present year under the removal of rebate of duty authorized in January have been from the United Kingdom, the total increase amounting to 1,140,969 tons. Meantime the exportation of coal has increased from the United States in the nine months ending with September, 1903, to 6,314,189 tons, against 4,720,330 tons in the corresponding months of last year, an increase of 1,503,859 tons, mainly to Canada and Mexico.

The reduced prices for American soft coal offer us again the opportunity for foreign shipments to European ports—suspended during high prices and heavy demand at home—if vessels could but carry coal at a fair figure. This probable competition is made much of by the coal operator of Wales, who tells his employees "there is no shutting out the fact that the exports of other countries become stronger and stronger rivals to the South Wales coal every year." It is only a short time ago that the Cunard Liners took sufficient bunker coal from Wales for the outward and homeward voyages. They do not do so now, the return voyage being made—it is said with good results—on American coal. Vessels from India, China, Japan and other countries in that direction make the return voyage to the Suez Canal with Australian or other coal, according to the country from which they sail, and the establishment of depots of American coal would give us that trade. The exports of Welsh coal to Rio,

La Plata and other ports in South America are, without question, declining, while the exports from America are increasing. Truly has it been said that the whole of the coal fields of America, Australia, &c., are, compared with the South Wales coal field, comparatively new as to their development, and the quality of the coal has been proven to be good, and the future coaling stations of the world will carry a supply of other than Welsh coal.

Census Report on Iron Workers' Wages.

Statistics of Foundries, Metal Working and Iron and Steel Mills.

WASHINGTON, D. C. November 10, 1903.—The Census Bureau is about to publish the results of an elaborate scientific study of the wages of employees in the principal manufacturing industries of the United States, including those which have been classified under the heads of "foundries and metal working" and "iron and steel mills." The comparisons made are for the years 1890 and 1900, but the form of presentation is entirely novel and marks an important advance in the preparation of statistics of real value to the trades represented. Through the courtesy of Director North and Chief Statistician Steuart, the correspondent of *The Iron Age* is enabled to present in advance those features of this interesting report which deal with the special industries above referred to.

For several reasons the problem of making a statistical presentation of the wages of workmen has been one of increasing difficulty. It has been the practice to obtain from each manufacturing establishment a return of the average number of employees during a census year with the total amount paid in wages. Almost inevitably attempts are made to derive from these figures a simple average representing the wages of the individual workman, although such attempts are expressly discountenanced in the reports issued by the Census Office. The public is more and more interested in the condition of the individual laborer, and the manufacturer in the wages paid in specified occupations in the various sections of the country, while the census statistics as heretofore published relate chiefly to labor in the mass. Formerly when occupations were more uniform in character and the variations between skilled and unskilled labor did not extend over so wide a range, the average referred to had considerable value, but with the specialization of machine processes the disintegration of long established occupations and the absorption of an enormous mass of unskilled immigrant labor, the merit of such a simple average has been seriously impaired, and it is more and more necessary to distinguish between wages of different classes of employees.

In order to secure data for this report transcriptions have been made of the actual pay rolls of a considerable number of the leading establishments throughout the country which were in operation in 1890 and in 1900. The wages and exact occupation of each workman were noted and made the basis of tabulations in which subclassifications by geographical sections are also presented, thereby enabling the manufacturer to note the tendency of labor costs in different parts of the country, with particular reference to the special branches of the work performed.

A departure from ordinary statistical methods has also been made in tabulating these figures, the "average" rate paid to each class being ignored in favor of the "median," a figure obtained by selecting the wages of the employee who stands half way between the lowest paid and the highest paid in the class under consideration. By the use of the median, employees at exceptional rates, either low or high, are not given an undue weight or importance, as they are when the average is used. Frequently, however, the median will not vary greatly from the average.

Foundries and Metal Working.

The New England, Middle, Southern, Central and Pacific States are represented in the returns for "foundries and metal working." The industry includes a wide variety in the nature of its products. A majority of the establishments are engaged in making heavy machinery, engines, boilers, &c.; there are several stove factories, also a few bicycle, sewing machine, firearm and cutlery and tool factories. In many cases the nature of the product manufactured in an establishment changed during the decade and, in some, improved machinery was installed.

The normal working time remained unchanged for the decade in a little over three-fourths of the whole number of establishments tabulated; in the remainder the changes, as a rule, were in the direction of a shorter working time in a week. In most of the establishments in which these changes took place the different departments do not work the same number of hours even at the same period. About one-half of the total number of establishments worked 60 hours at each period, and in the others the normal time ranged from 48 to 72 hours.

The exact time worked was reported for a considerable number of employees—about 8300 in 1890 and 15,000 in 1900. The proportion of males to all employees in the establishments considered is 97 per cent. in 1890 and 98 per cent. in 1900. The wages of females are therefore eliminated from consideration. Following is the table for this branch, showing the median rates per week:

Foundries and Metal Working.

CLASS AND SELECTED OCCUPATION.	1900.	1890.
Males 16 and over:		
New England States—		
Apprentices, machinists	$4.50	$4.00
Apprentices, molders and core makers	7.00	7.00
Apprentices, other occupations	5.00	6.00
Blacksmiths	15.50	15.00
Buffers and polishers	13.00	15.00
Carpenters and wood workers	13.50	13.50
Chippers and cleaners	11.50	10.00
Core makers	12.00	9.00
Erectors and assemblers	12.50	13.50
Foremen, machine shop	19.00	23.00
Foremen, not specified	18.00	18.00
General hands, helpers and laborers	8.00	8.00
Helpers, machinist	9.00	9.00
Helpers, molders and core makers	8.00	9.00
Machine tenders and second-class machinists	10.00	9.00
Machinists, including tool makers and metal pattern makers	13.50	13.50
Molders, floor	16.50	15.50
Molders, not specified	14.00	14.00
Packers	9.00	9.00
Painters	12.00	13.00
Pattern makers, wood and not specified	17.00	16.50
All other occupations	11.50	11.00
All occupations	11.00	10.50
Middle States—		
Apprentices, machinists	4.50	5.00
Apprentices, molders and core makers	4.50	5.00
Apprentices, other occupations	4.00	5.00
Blacksmiths	15.00	17.50
Boiler makers	12.00	13.00
Buffers and polishers	9.00	10.50
Carpenters and wood workers	13.00	13.50
Chippers and cleaners	9.50	9.00
Core makers	12.00	10.50
Engineers	12.00	12.50
Erectors and assemblers	13.50	15.00
Foremen, foundry branch	22.50	18.00
Foremen, machine shop	22.50	21.00
Foremen, not specified	15.50	18.00
General hands, helpers, and laborers	8.00	8.00
Helpers, blacksmiths	11.00	11.00
Helpers, boiler makers	9.00	9.00
Helpers, machinists	9.00	9.00
Helpers, molders and core makers	9.00	8.00
Machine tenders and second-class machinists	9.50	11.00
Machinists, including tool makers and metal pattern makers	14.00	15.00
Molders, floor	17.00	18.00
Molders, not specified	15.00	14.00
Painters	12.00	12.50
Pattern makers, wood and not specified	16.50	15.50
Sheet metal workers	13.00	14.50
Wire workers	7.00	7.50
All other occupations	10.50	12.00
All occupations	10.00	10.00
Southern States—		
Blacksmiths	15.00	15.00
Boiler makers	14.00	14.00
Carpenters and wood workers	12.00	12.50
General hands, helpers, and laborers	6.00	6.00
Helpers, blacksmiths	7.50	7.50
Helpers, boiler makers	7.50	7.50
Helpers, machinists	6.50	7.50
Helpers, molders and core makers	6.00	6.50

Machinists, including tool makers and metal pattern makers	14.00	14.00
Molders, not specified	15.00	14.00
Pattern makers, wood and not specified	16.50	15.00
Sheet metal workers	10.50	10.50
All other occupations	13.50	10.00
All occupations	7.50	10.50
Central States—		
Apprentices, machinists	4.50	4.50
Apprentices, molders and core makers	5.00	6.00
Apprentices, other occupations	6.00	5.00
Blacksmiths	16.50	13.50
Boiler makers	15.00	14.50
Buffers and polishers	10.50	8.00
Carpenters and wood workers	13.00	13.00
Chippers and cleaners	9.00	9.00
Core makers	11.00	10.00
Engineers	17.00	14.50
Erectors and assemblers	10.50	9.00
Foremen, foundry branch	21.00	18.00
Foremen, machine shop	21.00	19.50
Foremen, not specified	18.00	18.00
General hands, helpers, and laborers	9.00	9.00
Helpers, blacksmiths	9.50	9.00
Helpers, boiler makers	10.50	9.50
Helpers, machinists	9.00	8.50
Helpers, molders and core makers	9.00	7.50
Machine tenders and second-class machinists	9.50	8.00
Machinists, including tool makers and metal pattern makers	13.50	13.50
Molders, floor	18.00	15.50
Molders, not specified	15.00	12.50
Packers	9.50	7.50
Painters	9.00	9.00
Pattern makers, wood and not specified	16.00	16.50
Sheet metal workers	13.50	13.50
All other occupations	11.00	11.00
All occupations	10.50	9.50
Pacific States—		
Apprentices, machinists	4.00	7.50
Apprentices, molders and core makers	6.00	6.00
Apprentices, other occupations	7.50	6.50
Blacksmiths	18.50	20.50
Boiler makers	18.00	17.50
Foremen, not specified	23.50	25.00
General hands, helpers, and laborers	12.00	12.00
Helpers, blacksmiths	12.00	13.00
Helpers, boiler makers	13.50	10.50
Helpers, machinists	12.00	13.00
Helpers, molders and core makers	12.00	12.00
Machinists, including tool makers and metal pattern makers	18.00	19.50
Molders, not specified	18.00	21.00
Pattern makers, wood and not specified	20.50	20.50
All other occupations	14.00	9.50
All occupations	15.00	14.00
Males under 16:		
New England States—		
General hands, helpers, and laborers	3.00	3.00
All occupations	3.00	3.00
Middle States—		
General hands, helpers, and laborers	3.00	3.50
All other occupations	3.50	3.50
All occupations	3.00	3.50
Southern States—		
All other occupations	4.00	3.00
All occupations	4.00	3.00
Central States—		
Core makers	6.50	7.50
General hands, helpers, and laborers	4.00	3.50
All occupations	4.50	4.00

Iron and Steel Mills.

The Middle, Southern, Central and Pacific States furnish returns for this industry, but in the Pacific States the number of employees in the establishments reported is too small to warrant conclusions regarding wage changes. There seems to have been no marked change in the time regularly worked, but it should be observed that the peculiar conditions in this industry make it necessary to disregard the normal hours in a single week and adopt instead the number of hours per two weeks as a basis upon which to present rates of wages. The custom or necessity of operating some of the departments in certain plants without interruption is the cause of this difference in the treatment of the iron and steel industry.

In this industry there is an exceptional diversity in the product turned out by the mills represented; the returns are from blast furnaces, rolling mills, Bessemer converters and open hearth and puddling furnaces. The establishments reported differed greatly in size and variety, some including but a single one of the steps in the manufacture of the finished product, others combining many. There are thus comprehended in the industry several distinct phases, each including processes which are similar but require varying degrees of skill, and are so closely related that to classify them minutely would separate arbitrarily parts which by imperceptible gradations build up and compose one recognized, well defined, united industry. A representative number of returns from each separate subdivision would justify a separate presentation for each, but the purpose and opportunities of the present wage investigation did not make possible such exhaustive and detailed treatment, and perhaps it would not have been possible under any circumstances, owing to the almost endless variety of products and combinations of separate processes covered by the operations of a single company and often in a single plant. Following is the table for this branch, showing the median rates per week:

Iron and Steel Mills.

CLASS AND SELECTED OCCUPATION.	1900.	1896.
Males 16 and over:		
Middle States—		
Apprentices	$13.00	$11.00
Blacksmiths	29.00	27.00
Chargers	21.00	27.00
Cranemen and hoistmen	21.00	16.00
Cupola and furnace tenders	30.00	27.00
Engineers, locomotive and stationary	25.00	20.00
Firemen	23.00	20.00
Foremen	28.00	28.00
Gas producers	22.00	20.00
Hammermen	44.00	50.00
Heaters	55.00	55.00
Levermen	40.00	38.00
Machine hands	18.00	16.00
Machinists	29.00	25.00
Masons	34.00	30.00
Molders	30.00	29.00
Pattern makers	32.00	27.00
Puddlers	47.00	44.00
Rollers	65.00	65.00
Roll tenders	34.00	36.00
Shearsmen	27.00	24.00
All other occupations peculiar to iron and steel mills	17.00	16.00
General occupations not peculiar to iron and steel mills	17.00	15.00
All occupations	19.00	19.00
Southern States—		
Blacksmiths	28.00	27.00
Engineers, locomotive and stationary	28.00	28.00
Firemen	22.00	21.00
Foremen	32.00	27.00
Heaters	41.00	44.00
Machine hands	18.00	16.00
Machinists	28.00	28.00
Molders	28.00	25.00
Puddlers	37.00	27.00
Rollers	60.00	48.00
Roll tenders	25.00	20.00
Shearsmen	22.00	19.00
All other occupations peculiar to iron and steel mills	16.00	16.00
General occupations not peculiar to iron and steel mills	18.00	19.00
All occupations	18.00	18.00
Central States—		
Blacksmiths	34.00	35.00
Chargers	27.00	37.00
Cranemen and hoistmen	30.00	30.00
Cupola and furnace tenders	37.00	45.00
Engineers, locomotive and stationary	33.00	35.00
Firemen	25.00	24.00
Foremen	32.00	33.00
Hammermen	25.60	29.00
Heaters	85.00	60.00
Ladlemen	45.00	65.00
Levermen	70.00	70.00
Machine hands	21.00	25.00
Machinists	36.00	37.00
Masons	55.00	55.00
Molders	33.00	33.00
Roll tenders	48.00	36.00
Shearsmen	19.00	19.00
All other occupations peculiar to iron and sheet mills	23.00	21.00
General occupations not peculiar to iron and steel mills	28.00	28.00
All occupations	25.00	21.00
Pacific States—		
All other occupations peculiar to iron and steel mills	18.00	18.00
All occupations	18.00	19.00
Males under 16:		
Southern States—		
All occupations	6.00	6.00
Central States—		
All occupations	7.00	5.00
All sections—		
All occupations	7.00	6.00

W. L. C.

The Iron Age

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The Readjustment of Prices.

General business is always disturbed by reductions in prices after they have been forced to a high level by a period of great activity. Invariably, a season of extravagant buying is followed by an abrupt cessation in demand. Everybody is on the alert during a boom to discover symptoms of a reaction, and as soon as premiums are not being paid for prompt deliveries the shrewd or cautious buyer ceases to anticipate his requirements and limits his purchases to his barest necessities. It is surprising how quickly such a practice becomes general. Not only are large consumers thus affected, but the curtailment of purchases goes down the line to the smallest merchant. No one will be caught with high priced stock on his hands if he can prevent it. This is simply the instinct of prudence. It requires no panic or great failure or financial scare for its development, but may be roused by the mere belief that, by waiting, money will be saved. Under such conditions only urgent necessity or undoubted bargains will induce purchases. We are now passing through just such an experience, and in many lines the dullness is so pronounced that alarm is felt, and the question is pressing itself whether business will continue to shrink until we are plunged into a state of severe depression or whether the downward movement will be checked by a reawakened demand.

It may safely be assumed, we believe, that if there is nothing fundamentally wrong with the general business situation the quietness of trade will be only temporary. That is to say, its duration is more likely to be measured by months than by years, as was the case after the great panics of 1873 and 1893. That there is nothing fundamentally wrong would seem to be established by the remarkable fact that so few failures have been caused by the great shrinkage in stocks. The financial community has weathered the long stretch of storms, and even cyclones, in the stock market with wonderful freedom from serious wreckage. That an improvement has actually taken place in the temperament of those who have money to invest is shown by the ease with which large bond flotations have very recently been made by railroad companies. It would have been impossible to carry such schemes through a little earlier in the year. Of late the only stocks in which liquidation has not ceased are the steel stocks. Last week the pressure to sell these stocks almost precipitated a state of demoralization, and new low records were made. But the furious onslaught on the steel stocks is believed not to have been caused by any serious financial complications. It was partly due to price reductions announced on steel products, which, it was reported, would be so great as to cut down earnings most seriously. It was also partly due to rumors that the net earnings of the United States Steel Corporation for the current quarter would be not much over half of the earnings for the last quarter. These are unquestionably greatly exaggerated statements, but they had as much effect as if they were absolutely true. It is unfortunate for general business that the iron trade should appear to have its destinies linked with Wall Street, and that in the minds of many the outlook for the future is indicated by the course of the steel stocks.

The readjustments in prices which are now in progress, while they may not be stimulating to stock market values, are wholesome for trade in general, and the movement toward a lower level is only dangerous to those who were so imprudent as to believe that high prices would be permanent. It may not be necessary, and it would certainly be deplorable, to have to get down to the low prices of 1896-7, but it is essential to strike a level which will be attractive to consumers. This will carry with it readjustments in wages as well as in securities, because inflation has not been confined to the stock market. It is earnestly to be hoped that by the turn of the year most of the readjustments may be made and that the volume of business will then grow larger. The country is far from being in unsound condition and only awaits conviction that prices are on a safe basis.

Anti-Trust Legislation in New Zealand.

The British colonies in the Antipodes, for reasons lately given at some length in these columns, have become the fountain head of freak legislation on economic subjects. Whatever has been attempted in this direction has there been carried farther than has been deemed consistent with the interests of any other country, with the result that experiments in socialism have become an essential part of the law making function in Australia and New Zealand. The latest effort in that direction is the bill now pending in the provincial Parliament of New Zealand for the suppression of trusts and the abolition of all monopoly.

Everything considered, this kind of legislation in that kind of a country would seem to be, in the language of the old comedy, "something, if anything, anticipatory." New Zealand is as little troubled with trusts as India is with snow. True, there may be found snow on the peaks of the Himilayas, and there is in New Zealand one pathetic parody of what in this country and Germany we have learned to regard as admitting of the designation of a trust. It is an association of the flour millers, which does not include all the flour mills, and is as innocent of offense on the score of monopoly as can be imagined. But New Zealand does not believe in waiting until the horse is stolen before locking its barn door. It has, perhaps, read the American newspapers, or extracts from them. It regards the trust somewhat as it might the bubonic plague—an evil likely to spread unless a very rigid quarantine is established against infected ports. Consequently, it has watched its little combine of the flour mill owners with anxiety and their doings have been made much of, as if therefrom might arise evils which would destroy the state and subjugate the people to the bondage of servitude to an odious and soulless monopoly. To nip this menace to national prosperity and popular happiness in the bud, and see that no other noxious weeds of like character have a chance to sprout, the Premier of the Colony has introduced a Trade Monopolies Prevention bill as a Government measure, and is pressing it with a zeal worthy of a cause of greater magnitude if not of greater merit.

It is designed primarily to safeguard freedom of competition in the production and distribution of "goods," and to make its scope clear it defines goods as meaning all articles of food or drink, all building materials and furniture, all clothing and fabrics for wear or household use, including boots and shoes, every form of fuel, soap and candles, gas and electricity when used for light-

ing and all kinds of agricultural implements. This seems pretty broad, but it is really very narrow as a definition. It would have simplified the definition of goods and broadened the scope of the bill to have said that for the purposes of this act goods might be understood to mean everything produced and sold for use or consumption. That would have covered the ground. As it is a great many things might be cornered and monopolized without infringing the provisions of this bill. In legislation of this character it is commonly a mistake to particularize too closely. The old Dutch law against the playing of tenpins, as will be remembered, was nullified by omitting one pin and building the pyramid of nine pins.

The bill declares trade monopolies of every kind illegal, but again the mistake is made of being specific. Those designated as inimical to the letter and spirit of the act are designated as follows:

a. Any agreement, whether in writing or on verbal understanding expressed or implied, and whether all or only one or some of the parties thereto are residents of New Zealand, the dominant or one of the main objects of which, whether direct or indirect, is (1) to destroy, restrain or prevent the reasonable trade competition of the traders in the same or a similar trade, and whether in New Zealand or not, with the parties to such agreement; or (2) to enhance the price of goods sold by the parties to such agreement, whether such parties are engaged in the same trade or not, beyond the price reasonably obtainable for such goods, if such price were determined by the operations of reasonable trade competition in the absence of such an agreement.

To paraphrase this would be difficult. It certainly shows much ingenuity of phrasing. Also:

b. Any method of conducting or carrying on a trade, whether such method is employed by one trader alone or by several traders, the dominant or one of the main objects of which, whether direct or indirect, is to bring about anything or everything, or only a part of something, described in subdivisions 1 and 2 of the provision above quoted.

As another definition it may be mentioned that the term "method" as herein employed is understood to mean the formation of a pool, trust or combine of any sort, whether incorporated or not, "with an abnormal amount of capital or abnormally extensive operations for any particular trade." Still another definition, setting forth what is meant by "abnormal" in the purview of this enactment, would have been useful, though perhaps difficult. We have, however, an illuminating definition of "reasonable trade competition" which greatly assists in the comprehension of the bill. It is such "competition in any trade, as will not prevent or tend to prevent individual traders, or firms, or limited companies engaged in such trade and possessed of sufficient capital, knowledge and business capacity for carrying on such trade, from earning the fair average profits commonly earned by traders in such trade in the absence of any trade monopoly." If the bill had only gone on to state what are the fair average profits commonly earned by traders it would have very much enriched the literature of commerce, whereas it now is chiefly useful as contributing to the gayety of nations.

In enforcing the provisions of this bill, should it become a law, it will be "up to" the Supreme Court to exercise a very large discretion and to display abnormal judicial intelligence and acumen. For example, in determining what amounts to reasonable competition and whether it has been interfered with by operations complained of by those invoking the law's protection, the court must be governed not only by a regard for the interests of the traders who claim to be affected, but in even larger degree by the interests of consumers of the goods in question, and by the interests, material and social, of the public generally in respect of such trades; and it is impressed with a duty not to overlook the distinction between competition in the wholesale and retail branches of such trade.

The orderly method of procedure under the act to make its provisions effective is as follows: Those aggrieved by what they regard as a restriction of competion resulting from the acts of another or others may make representations in writing to the Minister of Labor or the Minister of Commerce and Industries. Such memorials must bear the signatures of not less than 50 reputable persons, and set forth that there are, in the judgment of the signers, reasonable grounds for believing that a trade monopoly exists. Such petition shall be forwarded by the Minister receiving it to the Register of the Court, who in turn shall send it to the District Inspector of Police for investigation. If the report of that officer confirms the allegations of the memorial, the Crown Solicitor and Audit Inspector shall look into the matter, and if it appears to them that a *prima facie* case is made out, an information will be laid by the Government, and the case shall be heard by the Chief Justice and two associate justices of the Supreme Court.

Then the trouble begins—all that precedes being official red tape, in what would seem to be a wholly unnecessary tangle. The opportunities of what in this country is called "graft" between the petitioners and the court seem to have been lost sight of, but perhaps not. If, however, the "information is laid" and the matter reaches the court, almost anything may happen thereafter. The court is empowered to accept practically any evidence it pleases, and to exclude what it does not care to hear. It may declare illegal any trade agreement which it regards as tending to promote monopoly, declare all contracts in pursuance thereof illegal, void and unenforceable, enjoin the defendant party from further carrying on business in the manner which it deems monopolistic, in fact or in tendency, and, if the defendant party is a corporation, may order it to be wound up and impose upon those composing it a fine in any sum it deems proper up to £5000.

This is an example of pretty wild legislation. It is amusing, no doubt, but it is even more instructive as showing what are the normal tendencies of socialistic law making in a country in which the wildest economic vagaries are hailed as revelations of new truth.

Small Gas Engines.

The gas engine is being installed in a great many small shops which formerly used steam as motive power, and this with very high priced gas, $1.25 per thousand feet. Either the boilers have given out, or the engines; sometimes coal is too dear. Whatever the particular reson may be, the gas engine is doing the work that steam did with entire satisfaction and marked economy. Its mechanism is simpler than that of the steam engine and is readily comprehended in its management by persons of ordinary intelligence. The economy of gas engines varies greatly, being governed wholly by the price of gas. With natural gas at 10 cents per thousand feet, producer gas at 50 cents and illuminating gas at whatever companies choose to sell it for, gas engines are still much cheaper to run than steam engines, and there is no question but that they are making great inroads on the small engine and boiler business. It is said to be possible to get 1 horse-power from 1 pound of coal reduced to gas, but steam engines are doing well when they produce 1 horse-power from three times that amount of coal. The gas engine of the future, however, will materially reduce the consumption of coal, or gas, which is the same thing, for there are material losses in it, due to phenomena not yet fully understood. Mr. Grover, an English gas engineer, made some experiments recently to measure the actual

and theoretic efficiencies of gas engines and finds that there are great discrepancies between what is theoretically possible and the gauge pressures registered in the cylinders direct with different volumes of gas and air. In a ratio of gas to air of 15 to 1 it was found that the observed pressure was 31 pounds absolute—that is, above the atmospheric pressure, while the theoretically possible pressure is 73 pounds; with a ratio of 10 gas to 1 air the observed pressure was 63 pounds absolute against 92 pounds calculated; at a ratio of 6 to 1, air to gas, the pressure upon explosion was 77 pounds absolute, while the calculated pressure should have been 119 pounds. This loss of efficiency has proven a puzzle to investigators, and they account for it by various speculations, such as thin films of water on the cylinder walls, absorption of the heat of explosion by the metallic portions exposed to the inflammation of the gas and losses directly attributable to the water jackets. If heat is a mode of motion, as an English scientist holds, then the gas engine is most wasteful; a gas engine of 35 horse-power known to the writer discharges at each exhaust a tremendous volume of heat, quite sufficient to do a great deal of work elsewhere; that this work should be done in the cylinder goes without saying. The report made by the exhaust is like that of a small cannon, showing that for some cause or another a large part of the energy of the explosion is dissipated on the air. This engine has the reputation of being a superior one of its class, but that there is room for further improvement is apparent.

How Shall We Improve Trade?*

BY W. P. DAVIS, ROCHESTER, N. Y.

For the past three years all machine tool builders who are building a good class of machines have had all they could do, and in many cases more orders than they could fill. The result has been many new manufacturing plants have sprung up and all of the old firms have enlarged and increased their output, until at the present time we can supply all the local demands and yet have a reserve capacity to fill foreign orders.

Our own country is growing rapidly, yet unless we have some export business we cannot expect to continue to run full time with our present capacity and market our products in our own country. There is no doubt but what the present slump in the sale of machine tools is due largely to the labor troubles which are holding up all kinds of business in all parts of the country, and which, if continued for any length of time, are going to bring on great loss and suffering.

The country is not in a condition that a financial panic should be expected. If the labor troubles are settled soon it is reasonable to expect a fair amount of business will be done for the next few years; yet no one should expect the volume that we have had for the past three years. We should begin to look for other markets than our own, and the question then arises, "Where shall we find the market?"

In the past few years we have found a large sale for our tools in foreign countries, but we must all admit there has been a great falling off in orders from abroad, and for many years at least we cannot expect as large a sale for our products as in the past.

The past summer I have traveled through the various countries of Europe from which we look for trade, and have made a careful study of the conditions and prospects. If there are any among you who have an idea that the Yankee is the only one who can copy and profit by what he sees, you should travel through Italy, Germany and England and see the shops that have been supplied with modern American machines, which have in many cases been copied, and in some cases changed to suit their demands. With labor far below the cost of our own, they are making tools that are so low in price that we cannot compete if they should adopt our system of manufacture.

We have, however, one great advantage over them, which is the fact that we manufacture in large numbers, while they manufacture a large variety. In one large shop in Italy, where 2500 men are employed, I found them building locomotives, passenger and freight cars, thrashing engines and machines and a variety of small machines as well; and in one department they were even making twist drills. So long as they build such a large variety of work in one shop they cannot produce any one of the various lines as cheaply as we can where we make a specialty of one line.

We have most to fear from Germany. Here I found a large number of manufacturing plants going up, and they were of a substantial kind, being well built and of modern design, with all of the latest improved machinery. With their improved plants and cheap labor and the enterprise and push of the German people, they are going to make us earn all the trade we get wherever they market their machinery.

In many parts of England they are far behind the times in putting in improved machinery, and many seem to think that the methods used by their fathers are good enough. So long as they cling to this idea we can compete with our English cousins and get our share of the trade. I believe that there is more chance to get American tools in England than in any foreign country I visited, if we take the time to visit the shops and introduce and show them, by actual use, just what our tools will do.

I have a kind word for the machine dealers of England. They are doing a good work, and are fairly up to date in methods and push. They carry a large stock. We all know that in order to sell a large quantity of machinery it is necessary to have a representative line to display. As London is a great distributing center, it is necessary to have our machines represented and carried in stock by some one of the leading machinery dealers. There are many of our tools that have not been properly shown up, or they would be in more general use.

We must admit that the past six months there has been a great falling off in the sale of machine tools, but I see nothing alarming about the situation. We should trim our sails according to the breeze. Instead of manufacturing large stocks and then attempting to go on the market and sell them at reduced prices, we should be reasonable and treat the conditions as we find them. Instead of keeping a large number of men at work, we should reduce our working force in proportion to the amount of business we are securing. If we find, on looking over the situation, that we can keep about the usual number of men by working less hours per day, this is a matter that should be considered, as it would be far better for the workingmen if the hours were reduced and they were all kept at work.

We must also take advantage of the present depression to improve our plants, introducing new methods and making such changes as we may find necessary in the design and construction of our machines. We must also devise the most improved methods of turning out our work and use good judgment in maintaining prices until business improves. None of us can afford to sell our machines at the present time at a lower price. Nothing can be gained by cutting prices. It would not only mean a loss to us, but to all of the machinery dealers as well, who, as we well know, are carrying in nearly all cases a larger stock than they can really afford to do.

In a few months at most we have every reason to expect better conditions in business. The country was never in a more prosperous condition. When certain changes have been brought about, I have every reason to believe we may all look for a fair amount of business, but we should not expect to see the order book crowded as in the past few years.

* Read before the New York meeting of the National Machine Tool Builders' Association

The molders in the foundries of the Youngstown, Ohio, district have recently been notified of a reduction in wages, to take effect on November 15, which will bring this class of labor to a basis of about $3 a day.

Close of Lake Ore Shipping Season.

DULUTH, MINN., November 7, 1903.—This week practically winds up ore shipments. A few scattering cargoes are to go down later, and a few mines will fill up their allotments, while in some cases there were late orders and changes of grades and destinations of ores that are yet to be taken care of. It looks now like a total of under 24,000,000 tons for the year, which will be 3,500,000 tons or more under 1902.

The Steel Corporation are through at all their large properties, with few exceptions. At Norrie and Tilden, Gogebic range, there is a little ore to be moved; Lake Superior and Regent group, Marquette range, are still shipping, on account of their outside connections; Chapin, Aragon and Pewabic, Menominee range, are about over; Fayal, Mountain, Hull, Rust, Sellers, Day, Clark, Chisholm, Stephens—in fact, nearly all their mines on the Mesaba—are either closed or to close the coming week; Burt and Adams are not yet quite through; Vermillion range mines will be through next week. Pickands, Mather & Co. are shipping a little from one or two Mesaba mines, but are through in most, both there and on the Menominee. The Sellwood and International Harvester mines have closed with 1,450,000 tons on all ranges. Corrigan-McKinney mines are done, with about 1,600,000 tons in all. Schlesinger is over with about 400,000 tons. Cleveland-Cliffs have a little more to ship, and will be moving ore all rail all winter. Penn Iron Mining Company are nearly through everywhere. Mahoning has sent down 1,010,000 tons and is closed. Jones & Laughlin are still shipping from Mesaba.

This is just about 30 days ahead of the corresponding action last year. From now to the close of navigation there is little to be moved on the upper lakes but grain and coal. The latter is about over, after by far the biggest business ever known. Up to November 1 there had been brought to Lake Superior 6,331,000 tons of coal, as compared with 4,810,000 the year before, which was the largest up to that time. In grain there is considerable to be moved forward before the close of this year, but in any event the total tonnage is a comparatively small matter. Many vessels, aside from those of the Steel Corporation, which are laying by fast, will be tied up in the coming week or two.

Mesaba Range.

Hull and Rust mines, in section 1, 57-22, have been closed for the winter by the Minnesota Iron Company, with shipments of 600,000 tons. Clark and Chisholm mines, in Section 28, 58-20, have also been closed by the same company. These two have shipped 500,000 tons. It is quite possible that Hull and Rust may be closed for some time, while the various companies in the Hibbing basin are sparring for position. The situation there is peculiar and interesting from its water level standpoint. While Penobscot, situated in the center of section 1, was active it took care of all the water of the basin. This was at tremendous cost, however, and the mine steadily pumped 4000 to 5000 gallons a minute. The main shaft of the Penobscot was down 285 feet vertically. Last spring this mine passed into the hands of the United States Steel Corporation and it was dismantled at once. This step might have been taken on account of the fact that it was a fee property, without royalty or minimum requirements, or in order that some one else might do the pumping for a while. Either would have been sufficient, and the first would have been ample from its accordance with the Corporation's policy. Penobscot once down, the water began to creep up. A short time ago it began to appear in the lower levels of Agnew, ½ mile southwest in Section 11. It also appeared on the foot wall side of Utica, still further west. Agnew shaft is almost precisely level with Penobscot and the bottom of the ore is 190 feet down. Utica shaft is a trifle higher. This mine belongs to the Buffalo Steel Company. Now the management of Agnew, which belongs to the International Harvester Company, begins stripping in order to mine by the milling process and thus to avoid the difficulty. Hull shaft is about the same elevation as Agnew and Rust is some 16 feet higher. These mines might get water if continued underground, but it is probable that when again operated they will be stripped and mined by steam shovel, and this will throw the water problem back on Agnew. All operators in the basin are watching the movements at Elizabeth, which is in Section 12, and which belongs to Pickands, Mather & Co. At this property they have commenced sinking a shaft, but have now stopped, without getting into ore, and their next move is unknown. Elizabeth is the lowest mine in the basin and will at some time take all the water there is left.

The Steel Corporation are commencing to open a new mine in 58-20, the Niles, into possession of which they recently came through the Chemung deal, then detailed in these letters. This lies just west of Shenango mine, which is one of the wet ones, and it contains some 10,000,000 tons of good ore. It will be an underground property, and one shaft is to be sunk this winter. Lincoln mine, of Jones & Laughlin, is to forward 300,000 tons this year, by far its best record, and is to be developed the coming winter for a production of not less than 500,000 tons in 1904.

Other Ranges.

At the old Taylor mine, at L'Anse, western end of the Marquette formation, reports of work to be done have been made in this correspondence from time to time the past few months. There are now 35 men at the mine just south of it. Here Fay & Yawkey also have land under option. They are much pleased with the outlook, and think the district probably important. Reports are that the ore lies in wide lenses under slight surface, and can be traced across more than 1 mile. It is rather siliceous, averaging perhaps 58 per cent. iron, and varies in phosphorus from below the Bessemer limit to 0.3. Others than Fay & Yawkey are preparing to go there and explore, and it now looks as though there might be material activity in that section the coming winter. An old road to L'Anse is to be repaired, and facilities will be improved at once.

At Norway, Menominee range, East Vulcan mine is flooded this week. A vugg was cut and the water rose very fast, and pumps throwing 1400 gallons were unable to control it. The shaft is 1200 feet deep, and it is now thought the water is under control. This is the first flow of any kind ever encountered in that immediate vicinity. Bessie mine, at Humboldt, is closed for the winter. It is believed the ore body is pretty well worked out. Exploratory work at Garfield property is stopped. Baltic, at Iron River, is pushing ore out as fast as possible to reduce stocks before the close. Penn Iron Mining Company, exploring at the Baker property, Iron River, are in ore at the depth of 275 feet. The Scott exploration on Section 10 is still looking well. It will be remembered that this is a distinct formation from any productive ore bearing rocks in that field.

The Chicago & Northwestern road is 1,000,000 tons behind last year in its receipts at Escanaba docks. This ore comes from three ranges. Competition has something to do with the diminution, but most of it is diminished movement from mines.

Exploration elsewhere in the lake region is cut down to the bone. One contractor on the Mesaba range has laid off 40 churn drills within a month, and another fully half of what he was operating. The change in attitude of contracting firms when negotiating for new work is quite marked. Diamond drill work is also letting up, and on the Vermillion range nothing is under way other than three drills on Section 30, 63-11. The Mahoning Ore & Steel Company, who have been exploring at Macomber and elsewhere for years, have stopped all work in the district. Even at Baraboo, Wis., where much work is planned, drills are idle in the older (western) portion of the field, and are not going in very fast just yet in the eastern section, though it is probable that more work will be carried on there later.

The Cleveland Cliffs Iron Company and the Oliver Iron Mining Company (United States Steel) are preparing for extensive displays at St. Louis next year. There will be models of several Oliver mines, old range and Mesaba open pit; a model of the Pioneer Furnace plant at Marquette, with its chemical works, &c., as well

as models of the Duluth ore dock system and Minnesota transportation facilities. The Pioneer Furnace has the biggest charcoal and by-product plant in America.

D. E. W.

Pig Iron Production Heavily Reduced.

Stocks Show Further Increase.

In spite of the fact that October had 31 days, the production of anthracite and coke pig iron fell off 128,435 tons, as compared with the September record. This, however, reflects only partially the effects of the restriction, since it did not become effective until well toward the end of the month. The capacity figures show the movement very much more clearly. There was a decline of very close to 80,000 tons per week, or at the rate of fully 4,000,000 tons per year.

The falling off has been greatest in the Central West, in which we include the Pittsburgh, Wheeling, Shenango Valley, Lake counties, Mahoning Valley and Chicago districts, and in the East, which includes New York, New Jersey, and the Schuylkill, Lehigh, Upper Susquehanna and Lebanon valleys. A comparison of these two since September 1, when production was normal, and November 1, with restriction in full effect, is shown in the following table:

Capacity in Tons Per Week.

	November 1.	October 1.	September 1.
Central West	144,538	216,249	219,516
East	38,486	47,648	52,237
Totals	183,024	263,897	271,753

The South has fallen off somewhat, the capacity declining from 56,751 tons on October 1 to 50,228 tons on November 1.

Stocks of anthracite and coke iron show an increase in October from 450,603 tons to 539,810 tons. Since the stocks do not include the accumulations at steel works, it is just to study them with reference to the product of the other furnaces. Of the total production in September of 1,553,717 tons, 956,363 tons were produced by the steel works, leaving 597,254 tons to the other furnaces. In October the product of the same furnaces was 596,067 tons, a decline of 37,000 tons. The stocks, however, increased 89,000 tons, so that the decline in output in October was not adequate. But with a restriction of capacity of 80,000 tons per week, the current make is evidently within the consumptive requirements. In fact, in some districts stocks are actually declining somewhat.

The following table shows the production in gross tons for the month of October, as compared with the four preceding months:

Monthly Pig Iron Production.

	June, (30 days)	July, (31 days)	August, (31 days)	September, (30 days)	October, (31 days)
New York	49,762	44,137	39,154	49,664	48,236
New Jersey	18,383	19,533	19,535	18,263	14,830
Schuylkill	46,550	41,143	45,759	47,744	38,750
Lehigh	62,972	60,861	56,540	45,938	35,862
Susq. and Lebanon	60,905	57,920	60,758	49,629	42,988
Pittsburgh	420,946	402,779	405,595	385,967	357,704
Shenango	118,743	108,234	88,484	84,827	81,232
West. Penn.	94,742	91,570	101,678	102,801	102,789
Md., Va. and Ky.	82,448	80,214	70,874	64,395	71,168
Wheeling	85,531	86,916	75,582	81,305	44,413
Cent. and No. Ohio	127,668	105,127	110,426	122,077	87,810
Mahoning V.	110,347	98,541	117,217	106,601	94,801
Hanging Rock and Hocking Valley	29,537	28,186	31,329	28,437	25,492
Ill., Wis., Minn., Mo. and Col.	207,023	201,386	208,778	201,070	200,062
Alabama	117,761	81,439	104,357	133,008	148,162
Tennessee, No. Carolina and Georgia	39,910	38,198	35,060	34,991	30,983
	1,673,228	1,546,184	1,571,126	1,553,717	1,425,282
Charcoal pig	43,678	44,432	42,995	42,986	37,537
Totals	1,716,906	1,590,616	1,614,121	1,596,703	1,562,819

* Production estimated for October, 16,150 tons.

There were blown out or banked on November 1 Franklin in New York, Oxford in New Jersey, one Brooke, Keystone and Tidewater in the Schuylkill Valley, one Allentown Rolling Mill and one Crane in the Lehigh Valley, two Carrie, one Duquesne, one Lucy, two Isabella, one Clairton in the Pittsburgh district, Alice, Ella, No. 2 and No. 4 Newcastle and Sharpsville in the Shenango Valely, Marshall and one Rockhill in Western Pennsylvania, one Bird Coleman, one Colebrook and Lochiel in the Lebanon Valley, two Bellaire, three Mingo and Top Mill in the Wheeling district, Zanesville in Ohio, Belfont and Etna in the Hanging Rock region, one Calumet, one North, one South and one Union in the Chicago district, Missouri, Mary, one Niles, two Ohio and Hazelton in the Mahoning Valley. In the South Talladega and one Lady Ensley blew out in Alabama and one Rockwood and Searles in Tennessee. There were blown in during the month Stewart in the Shenango Valley, Princess and one Crozer in Virginia, Ella, one Sloss and Hattie Ensley in Alabama and Chattanooga in Tennessee.

The total capacity of all furnaces in operation has been reduced, as is shown by the following table of the weekly capacity of the furnaces in blast on November 1, compared with preceding monthly periods:

	Total capacity per week. Gross tons.	Coke capacity per week.	Charcoal capacity per week.
November 1, 1903	282,219	273,715	8,504
October 1	361,492	353,142	8,350
September 1	369,933	360,197	9,736
August 1	362,330	353,681	8,649
July 1	395,042	384,825	10,217
June 1	398,139	388,178	9,961
May 1	381,697	373,496	8,201
April 1	376,576	368,215	8,361
March 1	354,733	347,424	7,309
February 1	343,111	335,339	7,772
January 1	353,800	346,073	7,727
December 1, 1902	343,817	336,617	7,200
November 1	337,559	330,110	7,449
October 1	345,048	337,837	7,211
September 1	335,189	328,243	6,946
August 1	336,465	328,745	7,720
July 1	310,950	303,793	7,157
June 1	344,748	337,492	7,256
May 1	352,064	337,627	6,437
April 1	337,424	331,140	6,284
March 1	323,028	316,039	6,989
February 1	332,045	325,440	6,605
January 1	298,460	291,992	6,468
December 1, 1901	324,761	317,358	7,403

Coke and Anthracite Furnaces in Blast.

Location of furnaces.	Number of stacks.	November 1. Number in blast.	November 1. Capacity per week.	October 1. Number in blast.	October 1. Capacity per week.
New York	18	9	10,668	10	11,103
New Jersey	8	4	2,881	6	4,580
Spiegel	3	1	166	1	180
Pennsylvania:					
Lehigh Valley	27	15	8,529	16	9,775
Spiegel	1	1	93	1	96
Schuylkill Valley	13	9	7,123	12	10,719
Low. Susquehanna	10	5	6,591	5	6,363
Lebanon Valley	12	3	2,445	6	4,842
Pittsburgh District	30	23	65,834	29	87,927
Spiegel	1	1	340	2	705
Shenango Valley	19	8	11,731	12	19,073
West. Penn.	19	17	22,553	18	22,967
Maryland	5	3	6,541	3	5,733
Wheeling District	12	5	6,715	11	18,971
Ohio:					
Mahoning Valley	15	8	14,982	13	27,882
Cent. and North	16	8	15,310	12	23,480
Hocking Valley	2	0	0	0	0
Hanging Rock	12	6	3,868	8	6,005
Illinois	19	15	28,626	19	37,334
Spiegel	2	2	1,000	2	867
Minnesota	1	0	0	0	0
Wisconsin	5	3	3,196	4	3,829
Missouri	1	0	0	1	804
Colorado	4	3	4,295	3	3,656
The South:					
Virginia	23	12	7,876	10	6,832
Kentucky	8	4	2,115	4	1,435
Alabama	41	32	33,125	31	30,217
Tennessee	16	11	6,580	13	7,028
Georgia	1	1	532	1	689
North Carolina	2	0	0	1	550
Totals	346	209	273,715	254	353,642

Production of Steel Companies.—Returns from all the plants of the United States Steel Corporation, the Cam-

bria, Pennsylvania, Maryland, Lackawanna, Wheeling, Ashland, Republic, Jones & Laughlin, La Belle, Bethlehem and Colorado companies show a total product of 829,215 tons for October, as compared with 956,363 tons for September, 993,564 tons in August, 987,855 tons in July, 1,021,839 tons in June, 1,037,325 tons in May and 966,850 tons in April.

Production of Spiegeleisen.—The production of spiegeleisen and ferromanganese was 10,374 tons in October, as compared with 8406 tons in September, 15,862 tons in August, 14,933 tons in July, 16,309 tons in June, 17,600 tons in May and 17,555 tons in April.

Stocks.

The position of furnace stocks sold and unsold, as reported to us, was as below on November 1, as compared with the preceding months, the same furnaces being represented as in former months. This does not include the holdings of the steel works producing their own iron:

Stocks.	June 1.	July 1.	August 1.	Sept. 1.	Oct. 1.	Nov. 1.
Anthracite and Coke.	182,665	234,425	311,174	365,701	450,603	539,810
Charcoal ..	20,738	22,585	31,289	45,305	56,245	57,589
Totals..	203,403	257,010	342,463	411,006	506,848	597,399

Fluctuations in Iron Stocks.

The following table shows the extent of transactions and the fluctuations in quotations of the stocks of iron and steel companies in the month of October, with the dates on which the highest and lowest prices on each stock were realized:

	Sales. Shares.	Lowest. Price.	Date. Oct.	Highest. Price.	Date. Oct.
Allis Chalmers, com.....	800	8	16	9	13
American Can, com.....	5,800	2⅛	30	3½	5
American Can, pref.....	11,300	27	15	32	5
Amer. Car & F'ndry, com.	82,000	17¾	15	26¼	7
Amer. Car & F'ndry, pref.	36,455	61¼	14	78	3
Amer. Locomotive, com..	28,055	10½	15	15¾	6
Amer. Locomotive, pref..	16,089	67½	15	83	2
Amer. Steel F'ndries. com.	500	4½	24	5¼	31
Cambria Steel.....	15,300	18	12	20	2
Central Foundry, com...	....	¾	5	1½	1
Central Foundry, pref...	....	5	29	8½	5
Colorado Fuel & Iron....	18,745	25	13	41	7
Crucible Steel, com.....	20,000	3⅛	23	8	3
Crucible Steel, pref.....	59,650	28½	22	60½	5
Dominion Iron & Steel...	5,150	7	13	10⅞	5
Otis Elevator, com.....	600	24	20	26¾	27
Otis Elevator, pref.....	150	75	9	80	1
Pressed Steel, com.....	35,500	26⅞	31	35¼	2
Pressed Steel, pref.....	8,300	67	15	77	5
Railway Spring, com....	4,360	16½	15	19	27
Railway Spring, pref.....	1,550	72	13	76	27
Repub. Iron & Steel, com.	15,050	7⅝	30	10	3
Repub. Iron & Steel, pref.	18,000	50½	30	63	3
Sloss-Sheffield S. & I.,com.	3,575	22½	16	27¾	17
Sloss-Sheffield S. & I.,pref.	100	68	12	68	12
Tennessee Coal & Iron...	72,300	26¼	15	34½	2
U. S. Steel Co., com.....685,000		12½	13	18½	3
U. S. Steel Co., pref....1,180,000		57¼	20	66	6
U. S. Steel Co., new 5s.25,461,000		68½	12	73¼	7
Warwick I. & S.....	800	3¾	22	4 1/10	1

At Reading, Pa., on November 7, on petition of Richard P. Lydon of New York, who alleges he is a creditor to the extent of $10,000, Robert Jennings of Jersey City was appointed receiver for the Carpenter Steel Company, whose works are in Reading, with offices in New York. The company's business was very profitable during the Spanish-American War, when they furnished large quantities of projectiles to the Government, but since then it has fallen off. The company were organized under the laws of New Jersey, with a capital of $3,500,000.

Dispatches from Denver, Col., state that the order of the Executive Committee of the United Mine Workers of America, declaring a strike of coal miners in the Rocky Mountain region, has been obeyed in Colorado almost to a man. The coal mines of Colorado are almost exclusively owned by the Colorado Fuel & Iron Company and the Victor Fuel Company. Dispatches from Salt Lake City state that the strike order has been ignored by the miners in the Utah coal fields.

MANUFACTURING.

Iron and Steel.

The name of the State furnace at Rusk, Texas, which is being rebuilt, has been changed from Old Alcalde to Sam Lanham.

The Chatham Furnace of the Union Iron & Steel Company, Chatham, N. Y., was blown out October 14.

The Chattanooga Furnace, Chattanooga, Tenn., resumed blast on November 1.

Antrim Furnace at Mancelona, Mich., will blow in about December 1.

Franklin Furnace, N. J., was banked October 23.

Lochiel Furnace, at Harrisburg, Pa., has been banked.

Jefferson Furnace, at Oak Hill, Ohio, will be blown out about December 25.

The Tidewater Steel Company, Chester, Pa., deny the report that lack of business caused the suspension of operations at their plant last week, and announce that the mills are again in operation upon the completion of much needed repairs. The company have a fair amount of business.

The Chesapeake Nail Works, Harrisburg, Pa., resumed operations with large bookings of orders on Monday, Nov. 9, after a shut down of three weeks.

The Central Iron & Steel Company, Harrisburg, Pa., resumed operations on Monday, November 9, after a shut down of one week.

The Phœnix Iron Company, Phœnixville, Pa., have posted notices that a 5 per cent. reduction of wages will be made November 15. The cut will affect nearly 3000 men. Building trades complications in the large cities are responsible.

Calumet Furnace, at South Chicago, Ill., was blown out October 31.

The Pittsburgh Steel Construction Company of Allegheny, Pa., have purchased a site at Ambridge, Pa., and will erect a new structural fitting shop. The new works will be located near the large plant of the American Bridge Company. When the new plant is finished the present equipment will be removed from Allegheny to Ambridge.

At the Shenango Works of the American Tin Plate Company, New Castle, Pa., 20 of the 30 hot mills were put in operation on Monday, November 9. The tinning department is on in full. It is said the other ten hot mills in this plant will be started in a short time.

The plant of the Pittsburgh Forge & Iron Company, at Pittsburgh, which has been idle for several weeks, is again in operation to nearly full capacity. The concern are manufacturers of hammered car and locomotive axles and railroad supplies generally.

A notice was posted November 9 at the tube mill of the Reading Iron Company, Reading, Pa., that the wages of the employees would be reduced on November 16. The puddlers will be reduced from $4.50 to $4 a ton, and all other classes will be reduced from 3 to 10 per cent.

Fannie Furnace, at West Middlesex, Pa., will blow out this month. The stack is to be rebuilt. As Ella Furnace at that place was recently blown out there will probably be no blast furnace in operation in West Middlesex during a good part of the winter.

The officers of the newly formed Acme Steel Company, Moline, Ill., mention of which was made in the October 29 issue of *The Iron Age*, are as follows: President, C. R. Stephens; vice-president, George D. Dunn; secretary and treasurer, George O. Gunderson. The directors of the company are: C. R. Stephens, George D. Dunn, W. E. Tolles, Moline; George O. Gunderson, Theodore G. Sellick, Chicago; W. G. Sawyer, Elgin.

Union men endeavored to interfere with the building of the plant of the National Rolling Mill Company at Vincennes, Ind. Anxious to make progress with the buildings, the company asked the local electric light plant to place arc lights so that the work could be done at night as well as day. The company also asked the telephone company to put telephones in the plant. The employees of the electric light and telephone companies refused to do the work, and this refusal was brought to the attention of the city council. The council ordered the two companies to do the work at once or forfeit their franchises.

The Mackie Steel Tube Company, whose plant is at Hammond, Ind., have gone into the hands of receivers, the State Bank of Chicago being appointed receivers. The Republic Iron & Steel Company are said to be the largest creditors.

Notices have been posted by the American Iron & Steel Mfg. Company, in their large works at Lebanon, Pa., of a reduction of wages, taking effect on November 23. The reduction is believed to be on a basis of 50 cents a ton for puddling. For a year past the scale has been $4.50. Other mills in that vicinity will make similar reductions. The shops are now working on a nine-hour schedule.

Notices have been posted in the Susquehanna Iron & Steel Company's mills at Columbia, Pa., stating that on November 23 the wages of puddlers would be reduced from $4.50 per ton to $4.

The Ward-Dickey Steel Company, who are erecting a plant

at Indian Harbor, Ind., for the manufacture of planished steel sheets, have incorporated with a capital stock of $50,000.

General Machinery.

The F. W. Spacke Machine Company, Law Building, Indianapolis, Ind., recently incorporated, will take over the business of another company in that city and will increase their facilities for the manufacture of general and special machinery. They expect to add an engineering department in the near future. At present the company are looking for a suitable location for a plant in Indianapolis and would favorably consider the manufacture of some staple line of machinery either on contract or to handle the line themselves. Fred. W. Spacke is president.

The Davis Expansion Boring Tool Company, whose incorporation was noted in these columns a short time ago, have a fully equipped plant at 3908-3910 North Broadway, St. Louis, Mo. The building is two stories, 35 x 70 feet, in which have been installed about $10,000 worth of machinery, including two gap lathes, two turning lathes, two screw machines, two drill presses, two milling machines, three grinding machines, shapers, forges, sundry tools, motor, &c. The company claim to be the only exclusive expansion boring tool manufacturers in the country.

The Pittsburgh Tool & Drop Forge Company, Arrott Building, Pittsburgh, Pa., with works at Cheswick, Pa., advise us that it is their intention to greatly enlarge their plant. They are manufacturers of sledge hammers, wedges, crowbars, railroad spikes and other tools.

The York Mfg. Company, York, Pa., manufacturers of ice machines, who recently enlarged their plant, are making further improvements and have announced their intention of training their own young employees to become competent ice plant erecting engineers, and a complete course of training under competent working instructors will be open to them. To this end the drafting department force will be increased to 30 men. The York plant is one of the largest of its kind in the country.

The Farmers' Co-operative Machinery Company are to locate their new plant at Whitby, Ont., instead of at Niagara Falls, Ont., as has been announced. The change was caused by Whitby increasing its bonus offer to the extent of $10,000. Manager McLaughlin is said to have resigned from the company because of the action of the Board of Directors in preferring Whitby after he had given out that the company would locate at Niagara Falls, Ont.

The Westinghouse Air Brake Company of Pittsburgh were granted a charter last week with a capital of $11,000,000. The new company are a merger of the Westinghouse Air Brake Company, organized in 1863, and the Electro-Magnetic Brake Company, organized about two years ago with a capital of $5,000,000. The officers of the new company are: George Westinghouse, president; Robert Pitcairn, first vice-president; H. H. Westinghouse, second vice-president; E. M. Herr, third vice-president; John Miller, secretary, and John Caldwell, treasurer. The Electro-Magnetic Brake Company were manufacturers of electric brakes for street car service, and these will continue to be manufactured by the Westinghouse Air Brake Company.

The Pennsylvania Engineering Works, New Castle, Pa., recently shipped a 200-ton metal mixer to the McKeesport department of the National Tube Company, at McKeesport, Pa.

Owing to lack of orders the large shops of the Westinghouse Air Brake Company, at Wilmerding, Pa., are now working eight hours a day and five days a week. It is said that one of the Gould railroad systems recently canceled a large contract for air brakes placed with this company.

The Genesee Valley Mfg. Company, Mt. Morris, N. Y., are busy on a large order for Missouri grain drills, to be shipped to Australia.

The Bignall & Keeler Mfg. Company, Edwardsville, Ill., advise us that they have received orders for two special machines from the Fairbanks Company, Canada, and are also building three special machines for the United States navy yards at New Orleans.

E. H. Dyer & Co. of Cleveland, manufacturers of sugar machinery, have closed a contract for a large beet sugar plant for the Fremont Sugar Company of Fremont, Idaho. The plant will cost about $750,000.

The Wyman-Gordon Company of Worcester, Mass., who are preparing to erect a branch factory in Cleveland, have awarded a contract to C. A. Carson for the erection of a drop forge shop, 60 x 68 feet. The building will be located on Wason street, near Superior street, adjoining the buildings formerly occupied by the Cleveland Crane & Car Company, which will be utilized by the Wyman-Gordon Company.

The Galena Iron Works Company, Galena, Ill., have increased their capital stock from $5000 to $20,000 and the Board of Directors from five to seven. A change was also made in their charter, increasing their lines of work.

The Wellman, Seaver, Morgan Company of Cleveland are building a Hulett "clam shell" ore unloading and conveying outfit, capable of handling 250 tons per hour, for the new docks of the Lorain Steel Company, at Lorain, Ohio.

The members of the firm operating under the name of the Roberts Machine Company, Columbia, Tenn., will dissolve partnership and form two firms. E. P. & W. M. Roberts will operate the machine shops, which they will overhaul and add some new tools to the present equipment. The working force will also be increased. J. F. Hines and W. R. Craig have rented a store, where they will open up a general hardware and implement business.

The Brooks Locomotive Works have delivered to the Wabash Railroad, at Chicago, 12 new passenger engines, six of which will be on the Chicago-St. Louis run and six on the main line. These engines weigh 150 tons each and have drive wheels 83 inches high. Each engine has 2499 square feet of heating surface in the flues. These locomotives carry 200 pounds of steam, which may be increased to 220 pounds. They are equipped with devices for taking up water from between the tracks while at full speed, and tanks are being put in between Chicago and St. Louis. The Wabash are making an extraordinary effort to take care of the World's Fair traffic.

The Ingersoll Milling Machine Company, Rockford, Ill., are just completing a concrete erecting shop, which is 55 feet wide and 200 feet long. Twenty-ton electric traveling cranes will be installed, which will lift 30 feet clear from the floor. It is expected that these improvements will nearly double the present capacity of the company's plant.

The Gardner Governor Company of Quincy, Ill., report that the increase in their export trade more than counterbalances the falling off in the home demand, and that they have on hand now and have shipped in the past two weeks more orders for export than ever known in their history. Orders for pumping machinery are in hand from the following points: London, England; Havana, Cuba; Osaka, Japan; Hungary; Russia; Belgium; Spain; Guaymas, Mexico; City of Mexico; Brisbane, Australia; Perth, West Australia; Victoria, British Columbia; Winnipeg, Manitoba; Montreal, Quebec; Truro, Nova Scotia; Amsterdam, Holland, and Havana, Cuba. To complete the shipments of this material, they say, will tax the capacity of their plant for 60 days at least, as orders are all in large quantities and are rush requisitions.

The George Whiting Company, Chicago, say that they are very busy, and from all they can see ahead the indications point to a continuance of operation to full capacity for some time to come. They secured more business lately and have done more than ever before in their history, and anticipate that necessity will require additional equipment to their plant. Some of the orders they have lately received are as follows: Holthoff Machinery Company, Cudahy, Wis., one single belt power punch, 15-inch throat structural jaw capacity, ¾-inch hole and ¾-inch plate; Mertes Miller & Co., Milwaukee, Wis., one single end belt power punch, 42-inch throat, boiler maker's jaw, capacity 1-inch hole, 1-inch plate, or 4-inch hole ½-inch plate; Scully Steel & Iron Company, for Holthoff Machinery Company, one belt power riveter, special, with 5-foot stake, arranged to be used as punch also, capacity to drive ⅝-inch cold rivets; Lemley & Schultz, Chicago, one single end belt power punch, 15-inch throat, structural jaw, capacity ¾-inch hole, ¾-inch plate; Marshall & Huschart Machinery Company, Chicago, for Pittsburgh Steel Construction Company, Allegheny, Pa., one single end punch, 18-inch throat, structural jaw, capacity 1-inch hole, 1-inch plate; E. A. Kinsey Company, Cincinnati, Ohio, for Alvey Ferguson Company, Louisville, Ky., one single end belt power punch, 15-inch throat, structural jaw, capacity ¾-inch hole, ¾-inch plate; Illinois Steel Company, Chicago, North works, one heavy plate straightening rolls, arranged with motor, capacity 1-inch plate, steel, cold; Mogg Coal Company, Chicago, one combined reviter and punch, special, with stake, 49½ inches long, capacity ⅝-inch cold rivets, driven. Marshall & Huschardt Machinery Company, for Lake Superior & Ishpeming Railway, Marquette, Mich., one single end belt power punch, 30-inch throat, plain jaw, arranged to be used as shear also, capacity to punch 1-inch hole, 1-inch plate; also one set belt power bending rolls, 10½ inches between housings, fitted with friction clutch pulleys, balance bar and hinged housing; Standard Forging Company, Indiana Harbor, Ind., four axle cutting off machines and one centering machine.

The Du Bois Iron Works, Du Bois, Pa., founders and machinists, have purchased from Osborn & Lundquist the patents for the Lundquist valve gear pump and will manufacture it on a large scale as soon as the patterns are completed.

Thomas Halton's Sons, Philadelphia, Pa., manufacturers of Jacquard machinery, will build a four-story addition to their plant. The building will be 54 x 64 feet, of heavy mill construction.

Power Plant Equipment.

The old established electrical engineering and contracting firm of Marcellus & Hall, 16 Dutch street, New York, have incorporated as Marcellus & Walton, with a capital stock of $10,000. The new company will extend the business and continue the manufacture of 2 and 5 horse-power motors, as well as the installation of electric plants of every description. The officers are: Harvey L. Marcellus, president, and Frank W. Walton, secretary and treasurer, who, with H. L. Hull, compose the Board of Directors.

The local electric light plant at Alamogordo, N. Mex., is to be rebuilt. A 225 horse-power Corliss engine and a 100-kw.

generator will be installed. In addition two small motor driven refrigerator plants of from 1 to 4 tons capacity will be put in this winter, and probably a 4 or 5 ton ice making plant in the spring. M. H. Fisher is manager and engineer in charge.

The Miller-McIntyre Machine & Mfg. Company have been incorporated at Rochester, N. Y., to manufacture engines; capital stock, $30,000. The incorporators are Joseph B. Miller, M. J. McIntyre and Eli H. Eaton.

The Ball Engine Company, Erie, Pa., are filling an order from the Sheridan Iron Works, Champlain, N. Y., for a 70 horsepower direct connected engine.

The Johnstown Light, Heat & Power Company and the Citizens' Light, Heat & Power Company, Johnstown, Pa., will amalgamate and new equipment will be installed, all of which has been purchased. There will be three 400-k.w. turbine sets, installed by Westinghouse, Church, Kerr & Co., of Pittsburgh, with a full complement of boilers, pumps, &c.

The power plant of the Oliver Chilled Steel Plow Works, South Bend, Ind., is now in course of construction and bids are being received for the water wheel harness and electrical apparatus.

J. D. Lyon & Co., Farmers' Bank Building, Pittsburgh, have been appointed agents for the Pittsburgh district for the Phœnix Iron Works Company of Meadville, Pa. They have secured an order for two 400 horse-power direct connected steam engines, made by the Phœnix Iron Works Company for the National Coal & Coke Company, whose plant will be located at Alberta, B. C.

The Indian Falls Hydraulic Company of Indian Falls, Ind., have been incorporated to construct a dam across White River and generate hydraulic and other power.

The City Council of Columbus, Ind., has decided to install a new electric light plant, the present one being worn out and obsolete.

The Dean-Waterman Company have been incorporated at Greenfield, Ind., and will take over the business of the Trees Mfg. Company. The company are capitalized at $20,000, and will manufacture gas engines and other machinery and conduct a general iron foundry. The officers are: President, Morris S. Dean; vice-president, Archer D. Dean; secretary and manager, Jewett Waterman, all of Cincinnati.

The Ware (Mass.) Electric Light Company have voted to spend more than $20,000 to increase their power station.

The light commissioners of Rushville, Ind., are asking bids until November 19 for one 100-kw. and one 250-kw. generators, direct connected to engines, switchboards, piping, transformers, lights, &c.; also on one 250-kw., belted type, single phase generator, one engine, arranged for belt, belting, switchboard, piping, lights, &c. A. L. Stewart, engineer; Harry Larkin, City Clerk.

Searles & Hirsh, Electric Building, Cleveland, are preparing plans for a large power building. It will be four stories high, of brick and heavy mill construction, and a power plant of considerable capacity will be installed.

The Hocking Valley Railway Company of Columbus, Ohio, have placed contracts wth the Elwell-Parker Electric Company of Cleveland for the electrical equipment for two lighting plants.

The Toledo Railway & Light Company of Toledo, who operate the street railway and lighting systems of that city, are preparing to erect an addition to their power plant, and will install new boilers, engines, generators and other power station equipment.

Foundries.

The Angola Engine & Foundry Company, Angola, Ind., manufacturers of gas and gasoline engines, will enlarge their plant and add a new line to the foundry department. A patent on a heating furnace has been granted them, and they will erect another foundry building, 50 x 100 feet, two stories high, for the manufacture of this furnace. The patterns for their new furnace are about ready, and the first furnace will be cast within a few weeks. In order to make provision for their increase in business and the new line, they will increase their capital stock from $20,000 to $50,000.

A. L. Pitts and James W. Thompson, Dubuque, Iowa, have purchased the business of Headford Bros. & Hitchins, and organized under the name of the Pitts-Thompson Foundry Company. They will make a specialty of gray iron castings and architectural iron work of all kinds. They will manufacture fire escapes and iron stairways.

The Reliance Iron & Engine Company, Racine, Wis., have been incorporated with a capital stock of $15,000, to manufacture all kinds of gray iron and engine work. The company will utilize and improve the plant of the Racine Malleable & Wrought Iron Company, and have taken over the equipment of the Racine Machine & Tool Works, of which C. E. Felgenhauer was owner. The officers of the new company are: J. P. Davies, president; Chas. E. Felgenhauer, vice-president, and T. W. Thiesen, secretary and treasurer.

Last week the Rosedale Foundry Company and the Specialty Mfg. Company of Allegheny, Pa., were consolidated under the firm name of the Rosedale Foundry & Machine Company. The business of the former companies as engineers, founders and machinists will be continued by the Rosedale Foundry & Machine Company, as will also the manufacture of the Playford improved chain grate stoker. A large, new foundry and machine shop was recently completed in Allegheny by the Rosedale Foundry Company, which are equipped with modern machinery.

The entire property of the Grove Foundry & Machine Company, at West Bridgewater, near Beaver, Pa., has been sold to the new Crawford Foundry & Machine Company. The plant will be enlarged and considerable new equipment added. William Crawford, formerly connected with the Westinghouse Machine Company, is president of the new company.

The Finley-Graves Foundry Company, Buffalo, N. Y., have been succeeded by the Finley-Otten Foundry Company, and the capital stock increased to $50,000. The company are now occupying their new foundry plant on Washington street, near Elk street, and in addition to their regular line of soft gray iron castings will engage in the manufacture of stoves and the Finley patent gas ranges.

Perkins & Co., Grand Rapids, Mich., will construct a new foundry, 60 x 80 feet. The building will be built of concrete.

The New York Car Wheel Works, Buffalo, which has been in the hands of a receiver for the past few weeks, was sold for the benefit of the creditors by Trustee Aldrich on Friday last to Joseph H. Berry of Detroit, president of the Manistique Iron Works, the price being $152,000. The sale is subject to confirmation by Referee in Bankruptcy Hotchkiss, whose decision, however, will be held in abeyance until a further meeting of the creditors, which will be held this week. The matter of confirmation of sale is held open for the reason that both the trustee for the creditors and the referee in bankruptcy consider the amount of the bid incommensurate with the value of the assets, and in the hope that possible bidders who were expected to submit offers on the day of sale, but had not done so, representing interests of the National Car Wheel Company or the Continental Iron & Steel Company, might meantime conclude to offer more. If such offer is received it would undoubtedly be acted upon favorably at the meeting of the creditors. Should this contingency not arise and the sale to the Manistique Company be confirmed, the continued operation of the car wheels works would be assured, as they would supply an additional market for the output of the iron mines of the Manistique Company.

Benjamin Barker has been appointed receiver for the Ramapo Car Wheel Company, Hillburn, N. Y., with permission to operate the works. The liabilities are $118,000, and assets $78,000.

The Penn Steel Casting Company, Chester, Pa., have elected the following officers for the ensuing year: President, M. H. Bickley; secretary and treasurer, George M. Booth; Directors, M. H. Bickley, J. W. Hawley, J. Max Bernard, George K. Crozer and George M. Booth.

The United States Malleable Iron Company of Toledo are preparing to erect their new plant. The main building will be 75 x 325 feet, with two L's 75 x 75 feet each. A pattern shop, 40 x 75 feet, a pattern storage house and an office building will also be erected. All buildings will be of brick, with steel structural work. The company will make malleable castings, including certain specialties of their own. The company are capitalized for $100,000, and the officers are: Robert G. Pew, president; Pressley G. Craig, vice-president; Walter H. Jeffrey, secretary-treasurer. The directors consist of the officers and R. G. Bacon and Thomas Percy. They expect to start work with 100 men.

At Pittsburgh the Pittsburgh Valve, Foundry & Construction Company, instituted equity proceedings against George E. Charles G. and W. L. Klingelhofer to restrain the defendants from engaging in the manufacture of trade articles in competition with the plaintiff company east of the Mississippi River. The bill sets forth that the defendants were connected with the Pittsburgh Valve & Machine Company, which was one of the interests included in the organization of the plaintiff company, and joined in the agreement by which they should not engage in the manufacture of goods manufactured by the plaintiffs nor compete with the latter in the territory mentioned for a period of ten years from 1900. An injunction is asked for.

Bridges and Buildings.

The Brackett Bridge Company, Cincinnati, Ohio, have received the following contracts for bridges and structural work: Twelve bridges for the Chatauqua Traction Company, Jamestown, N. Y.; complete electric power plant for the Camden Interstate Railway Company, Huntington, W. Va.; one 150-foot span for the Walnut Hills Coal & Mining Company in West Virginia: a 55-foot 15-ton traveling crane for the Jamestown Street Railway Company, as well as a large number of county bridges. The officers are: President, F. J. P. Brackett; vice-president and general manager, Geo. A. Brackett.

The investigation of the affairs of the Wabash Bridge & Iron Company of Wabash, Ind., has been begun before a referee in bankruptcy, at Logansport. The debts of the company are estimated at $320,000 and the assets at $50,000.

Fires.

The four-story brick factory at 14 Dunham place, Brooklyn, N. Y., was destroyed by fire November 7, entailing a loss of $100,000. The building was occupied by the Pescoba Broom Company, Goodyear Buckle Company, Noll & Volney, filter bag manufacturers, and James Alburley Cork Works.

The plant of the Orford Copper Company on Constable Hook, N. J., was damaged by fire November 9.

S. B. Stine & Son's foundry and machine shop, at Osceola, Pa., were recently damaged $10,000 by fire.

The machine shop of the Love Mfg. Company, Corry, Pa., was destroyed by fire last week. The loss is placed at $10,000.

Hardware.

The Palmer-Darnell Company of Bloomington, Ill., who recently effected a reorganization by a consolidation of interests with the Parsons Vehicle Company and the Columbus Vehicle Company of Columbus, Ohio, and the Keystone Carriage Company of Cincinnati, Ohio, have elected officers for the ensuing year as follows: President, H. M. Palmer; vice-president, J. N. Clarke; secretary-treasurer, R. E. Bebb; manager, C. C. Darnell; sales manager, R. E. Samis; superintendent, Gus P. Krag. The object of the consolidation was a saving in the cost of labor by adding new lines to the manufacturing end of the business at Bloomington and gaining for the Eastern parties a selling force and large jobbing trade. The company are now erecting a new factory at Bloomington, 100 x 200 feet and three stories high, which will be equipped with all the latest and modern machinery and will be operated with electric power. In addition to vehicles the company are making a manure spreader and report an already large trade on this machine.

The Goold, Shapley & Muir Company, Limited, Brantford, Canada, in conjunction with the Valley Iron Works of Bay City, Mich., have formed a new company with a capital stock of $75,000, to be known as the Valley Wind Engine & Iron Company, with offices at Bay City. The new company will manufacture the steel wind mills and grain grinders under the Brantford concern's patent. The officers of the corporation are: President, M. Garland; vice-president, W. H. Whitaker; temporary secretary and treasurer, Mrs. M. Garland.

The Wilkes-Barre Cutlery Works, Wilkes-Barre, Pa., are erecting an addition to their plant, 33 x 65 feet. This building will connect the main plant with a former file factory, which is to be used as an extension of the cutlery plant.

Indications point to the removal of the National Self Winding Clock Company from Bristol, Conn., to Norristown, Pa. The company have been reorganized with a capital stock of $750,000, 25 per cent. of which will be taken by Norristown people. The company purpose to erect at Norristown a plant costing not less than $100,000.

F. E. Kohler & Co., Canton, Ohio, have just installed a 50 horse-power gas engine of the double cylinder type, to operate their shovel department. They have also made various improvements in this part of their plant to facilitate the work and produce smooth goods. The company purpose gradually to increase their shovel line, and will have several grades, the quality of which will not suffer when compared with those of other manufacturers in this line.

The Winchester Repeating Arms Company have purchased a tract of land at Whitneyville, New Haven, Conn., which gives the company 200 acres in that section.

Star Novelty Works, Putnam, Conn., have been organized for the manufacture of toys, novelties and Yankee notions. The capital stock is $3000.

The Lamb Mfg. Company, Sioux City, Iowa, manufacturers of patent self heating sad irons, have established a branch factory at Lockport, N. Y., to care for their Eastern trade.

The Willoughby plant of the American Fork & Hoe Company of Cleveland was recently closed down, but the company deny the truth of the recent newspaper reports to the effect that the plant is to be abandoned permanently. It is stated that the plant will be utilized for certain special work next year.

Miscellaneous.

The American Automatic Switch Company, Pueblo, Col., have incorporated with a capital stock of $100,000 for the manufacture of a patented automatic street car switch, the invention of W. K. Smith, general manager of the company. The switch works on the principle that has been in use for years, the flange of the wheel forcing the tongue over when the car is running toward the base of the split switch. On this same principle the new switch is also opened by the car running toward the point. While it is probable that transit companies in large cities who may adopt the new switch will want to build and attach their own, it is the intention of the company to erect a plant at Pueblo and possibly one in Pittsburgh or some other Eastern city to supply the wants of the smaller cities and towns. T. G. McCarthy is president, W. K. Smith secretary and general manager, and George H. Williams treasurer.

The Yost Electric Mfg. Company, Toledo, Ohio, have arranged for the equipment for their new addition with the exception of a plating outfit, which they contemplate putting in some time within the next few months.

The Standard Chain Company, Frick Building, Pittsburgh, advise us that the report that they have received orders for merchant chain to be shipped to Brazil and Argentine Republic is erroneous.

The Toledo Match Company, Toledo, Ohio, will rebuild their plant, which was recently destroyed by fire, but no plans have as yet been prepared.

The Iowa City, Davenport & Muscatine Railway Company, Iowa City, Iowa, have been incorporated with a capital stock of $1,500,000 to build an electric railway from Iowa City to Davenport and Muscatine, Iowa., a distance of 61 miles. The officers of the company are: H. R. Berry, president; Thos. W. Crouch, vice-president; Milton Remley, secretary; L. S. Mitchell, treasurer; C. S Ranck, general attorney, and E. J. Spencer, chief engineer. Surveys are being made as rapidly as possible, and the company will soon be in the market for supplies.

Paul Dickinson, Chicago, has recently supplied his Giant cast iron smoke jacks to the following roundhouses: Baltimore & Ohio, 24 stalls at New Castle Junction, Pa.; 16 stalls, Terminal Railroad Association of St. Louis; 15 stalls at Fourteenth street, Chicago, Pennsylvania Railway; 15 stalls, Missouri, Kansas & Texas Railway, at Oklahoma City, Okla.

The Fiber Horse Shoe Company of Pittsburgh have been organized with a capital of $200,000, to manufacture horseshoes from fiber, canvas and wood pulp. It is claimed that horseshoes made from these materials are cheaper and will last longer than iron or steel shoes. The new company will build a plant in or near Pittsburgh, and offices have been opened in Room 306 Frick Building, that city. The officials are: George J. Peacock, president; Frank Niemann, vice-president, and Henry V. Potter, secretary.

George W. Payne & Co., Pawtucket, R. I., manufacturers of textile machinery, have incorporated as the George W. Payne Company. The business will be continued along the same lines and under the same management as heretofore.

The Winters & Prophet Canning Company, Mt. Morris, N. Y., are to erect a new fire proof factory building of brick and cement, and will equip same with modern machinery. The company will also manufacture their own cans.

The Wright Chair Company, recently incorporated at Buffalo, N. Y., have purchased a site of 9 acres on the Erie tracks at Hertel avenue and will at once erect and equip a modern plant. The main factory building will be 100 x 400 feet, of mill construction, and will be equipped with the latest wood working machinery, carving machines, &c. It is expected the plant will be operated with Niagara Falls electric power.

The Erie Basin Shipbuilding Company have been organized at Buffalo, N. Y., and will establish a shipbuilding yard on the Erie Basin. James McDougall, until recently connected with the Empire Shipbuilding Company, is president and manager of the new concern.

The Merrill Iron Works, Merrill, Wis., have secured the contract for installing the double pipe system of hot water heating in the Hoffman Block, at Merrill.

Holabird & Roche, architects, Chicago, are preparing plans for a two-story brick factory for the Sewell-Clapp Mfg. Company, makers of envelopes. The building will be located at West Twenty-first street and Douglas boulevard, Chicago, and will cost $30,000.

The International Harvester Company, Chicago, positively deny the report that they have purchased the Minnie Harvester Company's plant or the Walter A. Wood Company's plant, which amounts to the same thing, at St. Anthony's Park, Minn. They state that they have not a dollar's worth of interest in the Minnesota property, and that the newspaper stories to this effect are entirely false.

The Baldwin-Rowland Electric Switch Company have been incorporated under the laws of Connecticut, with a capital stock of $125,000, to manufacture a patent switch for street railway purposes, at New Haven, Conn. The officers are: President, Rollin S. Woodruff; vice-president, H. L. Rowland; treasurer, N. W. Kendall; secretary and general manager, F. W. Raymond. R. A. Baldwin, inventor of the switch, will be the superintendent.

Bowman & Cornell of Hartford, Conn., have begun the manufacture of a new patent safety gas burner for illuminating purposes.

The Norcross Brothers' Company, Worcester, Mass., have made application for a decrease in their capital from $1,500,000 to $500,000.

The Ajax Motor Vehicle Company, New York, have assigned. In January last the company's statement showed assets of $54,000 and liabilities of $20,500. The failure is attributed to dull business.

The Kingman Plow Company, Peoria, Ill., have increased their capital stock from $400,000 to $600,000. The additional stock will be used for improvements to their plant.

The Imperial Wheel Company, Flint, Mich., have increased their capital stock from $300,000 to $500,000.

The Pope Motor Car Company of Toledo, Ohio, have recently closed contracts for automobiles for next season with agents in Pittsburgh, Philadelphia, St. Louis and Chicago. The four orders aggregate nearly $250,000. The company are building a 28 horse-power car equipped with four cylinders and capable of carrying six people. A car of this type covered the recent New York to Pittsburgh endurance run, losing only 13 points, or 13 minutes, in repairs and adjustments in the 900 miles.

The Snell Cycle Fittings Company of Toledo, Ohio, will manufacture the California gasoline motor cycle, heretofore manufactured by the California Motor Cycle Company of San Francisco, and they will build 500 machines to start with. The motor cycle is very popular in the West.

The Iron and Metal Trades.

Our monthly blast furnace statistics indicate clearly how rapidly the manufacturers of Pig Iron are adjusting themselves to changed conditions. On October 1 the capacity of the Anthracite and Coke furnaces was 353,142 tons. On November 1 it had declined to 273,715 tons per week. The greater part of this decline of about 80,000 tons per week is due to the Central West, under the leadership of the United States Steel Corporation. The furnaces of the Central West dropped from 216,249 tons per week on October 1 to 144,538 tons per week on November 1. The Eastern furnaces, without any definite associated action, show a natural drop from 52,237 tons per week on September 1 to 47,648 tons on October 1 and 38,486 tons per week on November 1. The South, however, is driving ahead at a pretty full rate and is crowding the markets with offers considerably below the prices of competing districts.

As bearing on the current demand for Iron, it may be noted that stocks in the hands of merchant furnaces show an increase in October of 89,000 tons, which indicates that the actual decline in output in October was not great enough. As the cutting down of output really only began to tell toward the end of the month, it is reasonable to expect that we are now nearer a balance with the lessened make more effective. It must be taken into considration, too, in gauging the effect of furnace stocks, that the supplies carried in consumers' yards were never so low.

Interest has shifted from the crude Iron industry to the finished products, and here somewhat extraordinary developments have taken place. We have the spectacle of certain lines being reduced sharply, while prices have been reaffirmed in others under conditions which seem identical on the surface. In Steel Bars there has been a reduction of $6 per net ton, forced apparently by the long lead which Iron Bars have had for some time. In Hoops and Bands there has been a reduction of $5 to $6 per net ton, and in Tin Plate a reduction from $3.80 per box, at mill, to $3.60 has just been announced.

It is quite evident that in these branches the manufacturers have started out to find the level at which consumers will take hold, with the evident conviction that a good deal of desirable tonnage is being held back.

In other branches, after a good deal of discussion, radically different opinions seem to have prevailed. This is notably true of Steel Plates and of Structural Shapes. The point is made that prices were kept down during the boom and that the decline in raw materials has really brought them back to harmony with the old prices on Finished Material. Of course, a good deal of tonnage, notably in Plates for car building, is sold on sliding scales, and it is argued that any reduction in the price of Plates and Structural Material cannot create business where it does not exist. That this is not wholly true is pretty well understood in the trade, and it is certain that buyers will not depart from the attitude of reserve which they have maintained toward price schedules based on gentlemen's agreements. To the industry at large the decision means at least some, if possibly not much, restriction of consumption.

The Steel Rail makers are in session to-day. They did not, as reported widely, reach any decision concerning a reduction in prices.

The Steel Billet pool is having a critical meeting to-day. There is a possibility that it may be dissolved altogether and the market be officially wide open.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Nov.11, 1903.	Nov.4, 1903.	Oct.14, 1903.	Nov.12, 1902.
PIG IRON:				
Foundry Pig No. 2, Standard, Philadelphia	*$14.50*	$15.00	$15.00	$23.00
Foundry Pig No. 2, Southern, Cincinnati	*12.25*	12.25	13.50	22.75
Foundry Pig No. 2, Local, Chicago	*14.50*	15.50	15.00	23.00
Bessemer Pig, Pittsburgh	*15.10*	15.70	16.10	21.50
Gray Forge, Pittsburgh	*13.00*	13.50	14.25	21.50
Lake Superior Charcoal, Chicago	*17.00*	17.50	17.50	26.00
BILLETS, RAILS, &c.:				
Steel Billets, Pittsburgh	*23.00*	27.00	27.00	28.50
Steel Billets, Philadelphia	*25.00*	26.00	26.50	27.50
Steel Billets, Chicago	*24.00*	28.00	28.00	29.00
Wire Rods, Pittsburgh	*31.00*	33.50	33.50	35.50
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL:				
O. Steel Rails, Chicago	*12.50*	12.50	14.00	18.75
O. Steel Rails, Philadelphia	*12.25*	12.50	14.25	21.00
O. Iron Rails, Chicago	17.00	17.00	17.00	24.50
O. Iron Rails, Philadelphia	*16.50*	17.00	17.50	24.50
O. Car Wheels, Chicago	*17.00*	17.00	18.00	24.00
O. Car Wheels, Philadelphia	*15.00*	15.00	17.00	21.00
Heavy Steel Scrap, Pittsburgh	14.00	14.50	15.00	21.00
Heavy Steel Scrap, Chicago	*12.00*	12.00	13.00	18.50
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia	*1.40*	1.45	1.50	1.85
Common Iron Bars, Chicago	*1.40*	1.45	1.42½	1.80
Common Iron Bars, Pittsburgh	*1.30*	1.40	1.50	1.80
Steel Bars, Tidewater	*1.42½*	1.70	1.70	1.72
Steel Bars, Pittsburgh	*1.30*	1.60	1.60	1.60
Tank Plates, Tidewater	1.78	1.78	1.78	2.10
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.85
Beams, Tidewater	1.73½	1.73½	1.73½	2.00
Beams, Pittsburgh	1.60	1.60	1.60	2.10
Angles, Tidewater	1.73½	1.73½	1.73½	2.00
Angles, Pittsburgh	1.60	1.60	1.60	2.00
Skelp, Grooved Iron, Pittsburgh	*1.35*	1.40	1.50	1.95
Skelp, Sheared Iron, Pittsburgh	*1.45*	1.50	1.60	2.05
Sheets, No. 27, Pittsburgh	*2.40*	2.50	2.50	2.65
Barb Wire, f.o.b. Pittsburgh	2.60	2.60	2.60	2.45
Wire Nails, f.o.b. Pittsburgh	2.00	2.00	2.00	1.85
Cut Nails, f.o.b. Pittsburgh	*1.90*	1.90	2.15	2.05
METALS:				
Copper, New York	13.50	14.00	13.25	11.50
Spelter, St. Lois	*5.25*	5.40	5.45	5.15
Lead, New York	4.40	4.40	4.40	4.10
Lead, St Louis	*4.20*	4.30	4.30	4.00
Tin, New York	*25.00*	25.75	25.80	26.20
Antimony, Hallett, New York	6.25	6.25	6.25	7.25
Nickel, New York	40.00	40.00	40.00	40.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	*3.79*	3.99	3.99	3.79

Chicago.

FISHER BUILDING, November 11, 1903.—(*By Telegraph.*)

The expected has at last happened, and notwithstanding the losses that the deep reduction in prices involves, the leading Iron and Steel interests are feeling, if anything, more cheerful than before. They are disposed to pocket their losses bravely and push forward for business on the new basis. The forecaster is busy in guessing what the prices will be in other materials in line with the reduction of $6 per ton on Bars. Meanwhile orders are holding off or are placed only on guarantee of protection against decline. Unfortunately for the agricultural implement manufacturers the cut in prices in Bars, which they plead for last spring, comes too late to be of great service to them. While they would have been satisfied with a cut of $2 per ton in the spring and would have placed contracts for the season's business at that price, they now resent the reduction made at a time when they have ceased to clamor for it, and after they have bought so much of their season's supply as to make it impossible for them to lower the prices on their finished products. Each manufacturer of agricultural machinery is afraid that some incautious competitor will cut the prices in line with the tardy cut in prices of Bars and other Steel, involving a severe loss in every ton of Steel contracted for and used up to the present moment. The United States Steel Corporation officials are positive in their declarations that this cut of $6 per ton was made lower than surface indications seemed necessary, because they believed that it was wise to cut to the bone at the start and to stand firm at that price against every attack. Indeed, it is freely predicted that if the present low price does not stimulate buying the next move on the part of the producers

will be to raise prices a little higher each month until procrastinative buyers are stampeded into the fold. The prices on Finished Steel in the report which follows on lines that have not yet been decided upon by the meetings of their producers, while accurate to-day, will necessarily be inaccurate by the time this paper reaches its readers. Pig Iron producers are holding firm at $9.50, Birmingham, for No. 2, as a minimum price, and are making sales at $9.75 for single car lots. Rumors of $9 and lower, when traced down to cold facts, prove to be on offers of Canadian Iron reduced by mathematical calculation to the Birmingham basis. Sheets and Billets have both dropped in price, and the end is not yet. Plates, Shafting and Structurals will be decided before this issue goes to press. The feeling here is that busines will again resume its wonted activity in a very short time. It is estimated that there are fully 50,000 tons of Finished Steel in jobbers' warehouses in Chicago. A cut in prices averaging $5 per ton on this product means a tremendous loss to holders of this material, but they are willing to take this loss without complaining if it will only lead to a resumption of former activity in purchases from store.

Pig Iron.—Leading producers of Southern Iron seem disposed to make a stand at $9.50, Birmingham, for No. 2, which is $13.35, Chicago. At this price or 25c. higher many thousands of tons have been placed in this market the last six days, including some 1000-ton lots, but the great majority of the orders are for car lots or thereabouts to meet immediate requirements. A large Ohio Pipe founder is said to be in the market for 15,000 tons of Nos. 3 and 4, and quotations have been made him on the basis of $9, Birmingham, for No. 2. An occasional sale has been placed at $9.25, Birmingham, for immediate shipment from surplus stock, but the market may be said to be strong at $9.50 just the same. One firm producing 600 tons a day state that in the past ten days they have sold all their stock on hand, aggregating many thousand tons, at $9.50 to $9.75, and that they expect to market their current production from now on at $9.75 and $10. Northern Irons have been dropped $1 per ton below prices quoted last week by one local producer. Prices may be said to be as follows, the minimum representing quotations on large tonnages for prompt shipment and the maximum the single carload lots:

Lake Superior Charcoal	$17.00 to $18.00
Northern Coke Foundry, No. 1	15.00 to 15.50
Northern Coke Foundry, No. 2	14.50 to 15.00
Northern Coke Foundry, No. 3	14.25 to 14.50
Northern Scotch, No. 1	16.00 to 16.50
Ohio Strong Softeners, No. 1	16.80 to 17.05
Ohio Strong Softeners, No. 2	16.55 to 16.90
Southern Silvery, according to Silicon	14.85 to 15.10
Southern Coke, No. 1	13.85 to 14.10
Southern Coke, No. 2	13.35 to 13.60
Southern Coke, No. 3	12.85 to 13.10
Southern Coke, No. 4	12.60 to 12.85
Southern Coke, No. 1 Soft	13.85 to 14.10
Southern Soke, No. 2 Soft	13.35 to 13.60
Foundry Forge	12.60 to 12.85
Southern Gray Forge	12.60 to 12.85
Southern Mottled	12.60 to 12.85
Southern Charcoal Softeners, according to Silicon	17.85 to 18.85
Alabama and Georgia Car Wheel	21.85 to 22.85
Malleable Bessemer	15.00 to 15.50
Standard Bessemer	15.50 to 16.00
Jackson County and Kentucky Silvery, 6 to 10 per cent. Silicon	18.30 to 19.80
Basic Southern	13.85 to 14.35

Bars.—All the world knows now of the startling cut in prices of Steel Bars on the part of the United States Steel Corporation. While a week ago the officers of that company insisted that a reduction was simply out of the question, the official price is now $6 per ton less than heretofore, or, in other words, 1.30c., Pittsburgh, and 1.46½c., Chicago. One of the officers of the corporation stated that in his opinion it was a move of the greatest wisdom on the part of his company to cut to the bone at the start, and then if that cut did not stimulate buying, to gradually raise the prices, making procrastination costly on the part of users of Steel Bars. The Iron Bar producers are at sea and the market may be said to be an open one, producers taking the choice of closing their mills or making a price that will take the business. The leading implement manufacturers in the West have been induced into the using of Steel in place of Iron, which they formerly thought was indispensable. Steel can be worked by the common laborer, while Iron requires an expert blacksmith. Therefore Steel will be given the preference at even prices, except for special purposes where Iron is necessary. For such special purposes the Iron producers can secure a premium over Steel, but in order to compete with Steel where Steel can be used it will be necessary for them to quote $1 to $2 below the Steel prices. Small Steel Angles, less than 3 x 2, and Small Channels and Tees have suffered the same proportionate reduction as Steel Bars, in which class they belong. We quote for mill shipment, carload lots, Chicago: Steel Bars, 1.46½c., base, half extras; Iron Bars, 1.40c. to 1.45c., base, half extras; Small Angles, Channels and Tees, 1.56½c., base, half extras; $5 a ton is the reduction on Hoops, the prices being 1.91½c., Chicago, in carload lots and 1.81½c. in 250-ton lots and greater. From store large jobbers are disposed to make a cut only to 1.75c. on Steel Bars but one prominent interest is out with a cut to 1.60c. to large customers for pick ups on contract. We quote Iron Bars from store 1.75c., full extras; Steel Bars, 1.60c. to 1.85c., half extras; Small Angles, Channels and Tees, 1.70c. to 1.85c., half extras.

Structural Material.—Chicago interests are awaiting the result of to-day's meeting in New York. Until the new price shall be decided at that meeting old prices prevail—namely, 1.75c., Chicago, on Angles, Beams and Channels, in carload lots, and 1.80c. for Tees. Buyers are predicting that Structurals will be quoted at 1.46½c. along with Bars, while sellers hope that 5c. to 10c. extra at least may be decided upon by the meeting to-day. From store the price of 1.90c., cut to lengths of 5 feet and over, still prevails.

Plates.—Until the Plate Association shall have announced its new prices the old prices prevail in this market. But before *The Iron Age* reaches its Chicago subscribers these prices will doubtless have been greatly reduced—presumably from $4 to $6 per ton, though no one here can forecast the decision of the association. We quote official prices for shipment from mill as follows: Tank Steel, ¼ inch and heavier, 1.75c. to 2c.; Flange, 1.85c. to 2.15c.; Marine, 1.95c. to 2.10c.; Universal Mill Plates, 1.75c. to 2c. Plates from store continue to be sold at 2c. for ¼ inch and heavier, 2.10c. for 3-16 inch and 2.15c. for No. 8, with 10c. extra for Flange quality.

Sheets.—The rumor that was current last week that Sheets were sold in this market on the basis of 2.50c., Pittsburgh, for No. 28 has become an established fact, and a local producer announces that he is willing to take orders on that basis, which would be 2.66½c., Chicago. Local representatives of Pittsburgh mills, however, still maintain that the best price that they can make is 2.76½c., Chicago, for No. 28. This low price for the light gauge does not continue clear up the list. The following seems to be a fair statement of local car lot prices for mill shipment, delivered at Chicago: No. 10, 1.86½c. to 1.96½c.; No. 12, 1.96½c. to 2.06½c.; No. 14, 2.06½c. to 2.16½c.; No. 16, 2.16½c. to 2.26½c.; Nos. 18 and 20, 2.26½c. to 2.36½c.; Nos. 22 and 24, 2.36½c. to 2.46½c.; No. 26, 2.46½c. to 2.56½c.; No. 27, 2.56½c. to 2.66½c.; No. 28, 2.66½c. to 2.76½c.; No. 29, 2.76½c. to 2.86½c.; No. 30, 2.86½c. to 2.96½c. From store the jobbers have decreased their prices 10c. to 15c., as follows: No. 10, 2.15c. to 2.25c.; No. 12, 2.25c. to 2.35c.; No. 14, 2.35c. to 2.45c.; No. 16, 2.45c. to 2.55c.; No. 18, 2.55c. to 2.65c.; No. 20, 2.65c. to 2.75c.; No. 22, 2.75c. to 2.85c.; No. 24, 2.80c. to 2.90c.; No. 26, 2.90c. to 3c.; No. 27, 3c. to 3.10c.; No. 28, 3.10c. to 3.20c.; No. 29, 3.25c. to 3.35c.; No. 30, 3.35c. to 3.45c. Galvanized Sheets are still quoted at 75, 10 and 5, Pittsburgh, with 5c. freight allowance, on desirable specifications and 75, 10 and 2½ on mixed specifications, though the cut in the price of Sheets and the weakness in Spelter will doubtless lead to considerably lower quotations. From store Galvanized still sells at 75 and 5 per cent. discount.

Billets.—This is distinctly a buyers' market, and local producers are eager to take orders on the basis of $24, Chicago, for Billets, without being particular as to whether they are Open Hearth or Bessemer, for forging or rolling purposes. In less than car lots the price would be considerably higher, depending upon the quantity and the desirability of the specifications. The freight rate from Pittsburgh to Chicago is $3, and on the published Pittsburgh basis local prices should be $26 for Bessemer Rolling Billets, $27 for Forging Billets, with the standard extra of $3 for Billets for forging purposes; but the quotations named above as the actual market indicate the eagerness of the Eastern mills to compete with Western producers for what little trade there is in evidence here.

Cast Iron Pipe.—No change in prices has been noted, in spite of the falling market on Pig Iron, as producers claim that they are now using Iron that they bought at the high prices of two or three months ago. No large orders are on the *tapis*, and none are expected because of the lateness of the season. Small orders for quick delivery are coming in satisfactorily at the following prices, f.o.b. cars, Chicago: 4-inch, $29.50; 6-inch and larger, $28.50, in carload lots, for Water, and $1 per ton higher for Gas Pipe. These prices, however, are being shaded in quoting on large contracts.

Merchant Steel.—In line with the reduction in Bars, Merchant Steel for agricultural purposes has declined $6 per ton, on material belonging to the Bar classification, though some of the lines in the list have not been decided upon by the various associations interested. Dispatches from Pittsburgh to-morrow will doubtless tell of some cut in the price of Shafting, though prices on that commodity remain nominally the same as before up to the time the association meeting adjourns. Business at the present moment is, of course, at a standstill until prices shall have been decided upon, but it is the feeling in this market that as soon as prices shall have been fixed buying will begin in proper volume. We quote as follows in carload lots, Chicago, for shipment from mill: Open Hearth Spring Steel to the general trade, 2.25c. to 2.50c.; Smooth Finished Machinery Steel, 1.71½c. to 1.81½c.; Smooth Finished Tire, 1.66½c. to 1.76½c.; Sleigh Shoe, 1.51½c. to 1.61½c.; Cut-

ter Shoe unchanged at 2.41½c. to 2.51½c.; Crucible Tool Steel, 6½c. to 8c.; Special Tool Steel, 12c. to 14c.; Shafting unchanged at 47½ per cent. in car lots and 42 per cent. in less than car lots; Toe Calk Steel, 2.01½c. to 2.11½. It is doubtless true that the special prices named to makers of Carriage Springs and Car Springs on Open Hearth Spring Steel will suffer a cut corresponding to the reduction on Open Hearth Spring Steel to the general trade, and that the prices on the Low Phosphorus specifications and the Acid Steel grades will also fall in proportion to the standard grades, though no definite quotation can be secured in this market at this uncertain stage of the game.

Merchant Pipe.—Business continues to be good for what is naturally a slow season of the year. The leading producer makes no change in his prices, and states that his principals do not shade the prices given below under any circumstances. Independent mills, on the other hand, are said to be making special concessions to their regular customers, though their open quotations remain the same as before, conforming to the official discounts named below. We quote the following discounts in carload lots, random lengths, mill shipment, Chicago:

	Steel Pipe,		Guaranteed Wrought Iron.	
	Black.	Galvd.	Black.	Galvd.
	Per cent.	Per cent.	Per cent.	Per cent.
⅛ to ⅜ inch	66.35	56.35	63.35	53.35
¼ inch	68.35	58.35	65.35	55.35
⅜ to 6 inches	73.35	63.35	70.35	60.35
7 to 12 inches	67.35	57.35	64.35	54.35

Less than carloads, 12½ per cent. advance.

Boiler Tubes.—No change is noted in the price of Boiler Tubes, either from store or mill, and business is only fair, representing the actual current necessities of the boiler shops. The following discounts are current:

	Discounts, per cent.		
	Steel.	Iron.	Seamless steel.
1 to 1½ inches	40.85	37.35	53.35
1¾ to 2½ inches	53.85	36.35	40.35
2¾ to 5 inches	59.35	46.35	up to 4 in. 48.35
6 inches and larger	53.85	36.35	....

Quotations on Boiler Tubes from store in car lots or less are as follows:

	Steel.	Iron.	Seamless steel.
1 to 1½ inches	40	35	37½
1¾ to 2½ inches	50	32½	35
2¾ to 5 inches	57½	42½	45
6 inches and larger	50	32½	..

Rails and Track Supplies.—Such large buyers as there may be in the market are evidently holding off until it is distinctly settled whether the reduction in the price of Billets will be reflected in a reduction in Rails. The leading producer is very positive in his statement that whatever reductions there may be in other lines of Finished Steel there will be none in Rails. Predictions of this kind have so frequently been made and come to naught that buyers are all Missourians and want to be shown. Standard Sections are quoted as before at $28, maker's mill, which means $28, Chicago; 20 to 25 lb. Rails are quoted at $28 to $29, maker's mill, and 12-lb. Rails as low as $29 to $30. In the lighter sections the quotations are from independent mills rather than from the leading producer. We quote Track Supplies as follows: Angle Bars, 1.90c. to 2c.; Spikes, 2c. to 2.10c.; Track Bolts, 3½ x 3¾ inches, 2.75c. to 2.85c., with 15c. advance for Hexagon Nuts.

Metals.—Copper has suffered a slight reduction in spite of the continued tie up of the Amalgamated interests, and should their plant start up again a decided drop in prices may be looked for. Casting Copper may be quoted at 13c. to 13½c. and Lake at 13½c. to 14c., in carload lots, Chicago. Lead is firmer; while the 50-ton lot price remains at 4⅜c., the carload price at 4.40c., the less than carload buyer has to pay 4.70c. instead of 4⅝c., the ruling price of last week. Spelter has suffered at the hands of the executioner, a clean cut of 10c. being quoted; 5.55c. to 5.65c. in car lots and 5.90c. to 6c. in small quantities. Pig Tin is offered at 26c. in car lots, and 26½c. in less than car lots. Old Copper and Brass have been reduced under light demands. The following quotations are current: Heavy Cut Copper, 11¼c.; Copper Bottoms, 10¼c.; Red Brass, 10c.; Lead, 3.85c., and Zinc, 4⅜c., spot.

Old Materials.—The market is so unsettled as to make it almost impossible to give exact quotations. The demand is only intermittent. Offerings from the country are light, but railroads are offering very freely. It is reported that prices of many grades are shaded in special instances, but the quotations which follow may be taken as those nominally correct. It is said that Relaying Rails have been sold as low as $21, and one concern expected to sell 200 tons of Cast Borings at $4. We give the following as approximate quotations per gross ton, f.o.b. cars, Chicago:

Old Iron Rails	$17.00 to $17.50
Old Steel Rails, mixed lengths	12.50 to 13.00
Old Steel Rails, long lengths	14.00 to 14.50
Heavy Relaying Rails	23.00 to 23.50
Old Car Wheels	17.00 to 17.50
Heavy Melting Steel Scrap	12.00 to 12.50
Mixed Steel	11.00 to 11.50

The following quotations are per net ton:

Iron Fish Plates	$13.00 to $13.50
Iron Car Axles	17.00 to 17.50
Steel Car Axles	14.00 to 15.00
No. 1 Railroad Wrought	13.00 to 13.50
No. 2 Railroad Wrought	11.50 to 12.00
Shafting	14.00 to 14.50
No. 1 Dealers' Forge	11.00 to 11.50
No. 1 Busheling and Wrought Pipe	9.50 to 10.00
Iron Axle Turnings	10.00 to 10.25
Soft Steel Axle Turnings	9.00 to 9.50
Machine Shop Turnings	8.00 to 8.50
Cast Borings	4.50 to 5.00
Mixed Borings, &c.	4.50 to 5.25
No. 1 Boilers, cut	10.00 to 11.00
Heavy Cast Scrap	12.00 to 12.50
Stove Plate and Light Cast Scrap	9.50 to 10.00
Railroad Malleable	11.00 to 11.50
Agricultural Malleable	10.00 to 11.00

Coke.—The announcement on the part of the H. C. Frick Company that they have again entered the general field for the sale of Coke has been distributed in circular form to all the leading founders in the West, and the price quoted of $2.65, at the ovens, for 72-hour Foundry Coke, which would be $5.30, Chicago, may be taken to be the ruling price for that commodity. Less highly favored Cokes will doubtless have to shade this price in competition with Frick. It is almost impossible to name a price on Furnace Coke, though it is certain that it is not higher than $4.40 to $4.55, Chicago. Business continues to be of a hand to mouth character, as the leading Coke users have not forgotten the days when they were buying Coke at $1 to $1.50 less than prices now quoted. It is worthy of note, however, that it costs more to produce Coke now than it did some years ago, owing to the gradually advanced cost of Coking Coal lands in the only district of the Connellsville region in which mines worth working still exist. Lands now bring $1500 an acre than only a few years ago went begging at $400 to $500, and Coal has to be brought up from deeper and deeper shafts each year.

Philadelphia.

FORREST BUILDING, November 10, 1903.

Important developments have been made during the past week, mainly, however, in finished products. Four dollars per ton reduction in Billets and $6 in Steel Bars seems to be rather an extreme movement at one swoop, but as a reduction had been looked for it has had no great effect beyond emphasizing the fact that prices were too high. It is not likely to bring in much business, however, as the business is not there; but it brings finished products more in harmony with the prices of raw material, and to that extent it will be helpful. The Bar Iron trade will be rather badly hit, but with cheaper Scrap and cheaper Pig Iron the Bar mills may yet be able to hold a portion of the trade even at 1.43½c. for Steel. It will result in a strenuous effort for lower costs, however, and while it is not improbable that the new list will be maintained during the remainder of the year, there is more or less uncertainty in regard to prices during 1904. Those who need material for delivery during 1903 are not likely to gain anything by waiting for further reductions, simply because they are impossible on the present basis of costs. The feeling would be more settled if the entire list had been gone through. Quotations for Plates and Structural Material are under consideration, and will probably be announced in a day or two. There is an impression that two-tenths' reduction will be made, although some claim that one-tenth will be the limit; but whatever it may be, buyers are not disposed to do anything until some definite announcement is made. Pig Iron has not been affected to any extent and prices are about as they were a week ago, but there is very little demand—little as regards tonnage, a great deal as regards number of orders, but there is no disposition to buy more than to supply early requirements. This insures a fairly steady demand continuously, as there is little or no Iron in consumers' yards, so that whatever may be needed next week or the week after must be secured this week or next week, as the case may be. The export trade is attracting attention, and while, of course, it is a good thing to secure as much outside business as possible, it can only be done at extremely low prices. German Billets can be bought at $18.50; Structural Material at less than 1c. per lb., f.o.b. German ports, and at British ports Plates can be done at less than 1.20c., so that it is clear that there is no money in exports on the present basis of costs, and although costs will no doubt be reduced, it is equally certain that prices will also be reduced to meet American competition. Under these circumstances it is by no means certain that prices can be permanently maintained on the new schedule, although they will be given a fair trial until there is additional light on the situation.

Pig Iron.—Prices are very much the same as they were a week ago, but there is no heavy buying at any price. Some extremely low figures are quoted on Alabama Irons, but Pennsylvania brands hold at anywhere from $15 to $15.75, according to brand, quality and point of delivery, while the

first named may be had at from $13.50, on dock, to $14.25 for deliveries in buyers' yards. The restriction in output helps to maintain prices on all local Irons, but there is a similar restriction among buyers, so that for the time being it is a stand off on both sides. The real contest will begin after the holidays, but in the meantime it is hardly probable that there will be anything but a hand to mouth market at about the figures now ruling. What may be done when prices for 1904 have to be arranged is a matter of uncertainty, and will depend on developments in the interim. Advances are not expected; a decline from present quotations may or may not be made. If there is any reasonable prospect of a better demand, efforts will be made to maintain prices, but the entire situation hinges on demand. Prospects are not particularly good, but there is a fighting chance for improvement, and there is a general disposition to make the best of a somewhat unfavorable situation. The trend of events during the next two or three months will give a pretty good idea of what to expect during the first half of 1904, but in the meanwhile it is not likely that extensive operations will be entered into. Wall Street happenings have been extremely depressing during the past two or three months, and a great deal will depend on influences from that center, particularly toward the close of the year. It is unfortunate that the Steel trade is dominated by speculative influences as it never was before, but belittle it as we may, there is no question that the entire trade has suffered by the connection. Prices of Pig Iron, however, have a very wide range, but it is fairly covered by the following quotations which are for Philadelphia or nearby deliveries:

No. 1 X Foundry	$16.00 to $16.50
No 2 X Foundry	15.00 to 15.75
No. 2 Plain	14.50 to 15.00
Southern No. 2, rail shipment	14.00 to 14.50
Southern No. 2, on dock	13.50 to 13.75
Standard Gray Forge	13.75 to 14.25
Ordinary Gray Forge	13.25 to 13.50
Basic	14.00 to 14.25

Steel.—At current quotations there is no apparent reason to delay placing orders, but in the meanwhile business is rather quiet. About $25 is quoted on ordinary sized lots, but $24.50 or better could be done for first-class specification.

Plates.—The situation is somewhat unsettled at the present time, owing to price reductions made in Steel Billets and Steel Bars. It has been assumed that a reduction would also be made in Plates and Structural Material, but so far no definite action has been taken in regard to either of these specialties. A meeting is being held, however, after which some announcement will be made, but whether it will be a reaffirmation of present quotations or a reduction is not known, pending which quotations are omitted.

Bars.—The Bar Iron trade is considerably unsettled, owing to the reduction in the price of Steel Bars. The demand would not be heavy under any circumstances, but $6 drop in Steel is rather a tough proposition. Nevertheless there is always some demand for Refined Bar Iron, so that, after all, it is largely a question of price, and the Iron mills will no doubt meet the cut, but may not go below it. For the present, therefore, quotations are about 1.40c. for Refined Bars and 1.43¼c. for Steel, but no great demand for either at the present time.

Sheets.—Business is extremely dull and the market very unsettled, although for first-class Sheets buyers are still willing to pay comparatively good prices. Business is very unsatisfactory, however, and common Sheets can be had at lower figures than for a long time past.

Old Material.—Everything dull, weak, and in most cases lower. Steel is practically without a market, so that prices are almost nominal, bids and offers for deliveries in buyers' yards being about as follows:

Old Steel Rails	$12.25 to $12.75
Heavy Steel Scrap	12.00 to 12.50
Low Phosphorus Scrap	20.00 to 21.00
Old Steel Axles	14.00 to 15.00
Old Iron Rails	16.50 to 17.00
Old Iron Axles	17.50 to 18.50
Old Car Wheels	15.00 to 16.00
Choice Scrap, R. R. No. 1 Wrought	15.00 to 16.00
Country Scrap	14.00 to 14.50
Machinery Scrap	13.00 to 14.00
No. 2 Light Scrap	11.50 to 12.00
No. 2 Light (Ordinary)	9.50 to 10.50
Wrought Turnings	10.00 to 10.50
Wrought Turnings, Choice Heavy	10.75 to 11.25
Cast Borings	6.75 to 7.25
Stove Plate	10.50 to 11.00
Wrought Iron Pipe	12.00 to 12.50

Justice Cox, Jr., & Co. have removed their offices from the Bullitt Building to 1236-1238 Land Title & Trust Building, at Broad and Chestnut streets, which vicinity is gradually becoming the center for the Iron and Steel interests.

A cablegram from Sydney, Australia, dated November 4, states that Prime Minister Deakin has announced that the Government of the Australian commonwealth has decided to offer a bounty for the production of iron, and that it will pay a similar bounty in agriculture.

Cleveland.

CLEVELAND, OHIO, November 10, 1903.

Iron Ore.—The movement of Ore down the lakes has been so light that many of the boats which have been engaging in the lake trade have been forced to the dock. This is true of the boats of the Pittsburgh Steamship Company—the Steel Corporation's fleet—all of the barges of which and some of whose steamers have been laid up. The movement is becoming general, both among the independent and the corporation owned ships. The indication is that the end of the season is about here. The curtailment of the shipment down the lakes continues on the part of the shippers, and the demand is also decreasing because of the lessened melting. The movement during November promises to be the lightest in years. The rates, of course, have not changed in the slightest, being purely nominal on the basis which has held during the season—namely, 80c. from Duluth to Ohio ports. The laying up of many of the boats is supposed to be in the interest of higher charges on a few wild cargoes late in the season, but this hope may not be realized. The October Ore movement was 3,006,857 tons, a decrease from the same month in 1902 of 304,569 tons. The movement to November 1 was 22,383,350 tons, a decrease from the showing to the same date last year of 1,636,686 tons.

Pig Iron.—Pig Iron conditions in this territory have hardly changed other than that the consumers seem to be more timid and more hesitating than ever. It is said that the Southern Iron, which was sold here last week, was larger in volume than during any two or three weeks since May. The Northern furnaces make only one concession in price against the continued cutting of prices by the Southern stacks. Northern furnaces are meeting local conditions, the price for No. 2 being $14.50 at the furnace, instead of the usual Valley basis. The old basis is quoted by some stacks, but the majority of them make the other concession, a few going as low as $14.25 at the furnace. Their sales have been rather limited. There has been a fair demand for Malleable, some of the furnaces having started on that Iron instead of the other grades. The agricultural implement works, getting a satisfactory price, have been buying rather freely. The market is represented at a quotation of between $15 and $15.50 in the Valleys. It would not be possible now to quote a price on either Bessemer or Basic. The market is dead. Many of the stacks are preparing to blow out December 1, on account of the state of the market, further curtailment of production having been talked of. The Coke supply in the Valleys is adequate. The improved car supply has given all the material needed. The market has held firm, regardless of the seeming excess over demand, but the poorer Cokes have been getting the lion's share of the business, because they offer a saving. The best 72-hour Foundry Coke is bringing $3, and High Sulphur Cokes $2.75 at the oven.

Finished Iron and Steel.—The sudden drop in the price of Steel Bars, following the persistent refusal to make such a concession, only added a feeling of unrest to the troubled Steel situation. Buying on a falling market is seldom indulged in, and that phenomenon has not been conspicuous here. Inquiries have increased slightly, but no buying has resulted. The only immediate effect is a slight quickening of specifications against contracts taken on a guarantee. The market, however, did not respond to the decline in prices with any pronounced buying movement. Contract booking looks to be as remote now as it has been at any time during the past few months, during which time the consumers have been buying hand to mouth. The change in relations, however, between Bar Iron and Steel have again reverted to the old basis, and the substitution of Iron for Steel has stopped, thus increasing the spot buying of the Steel product. The buying of Bar Iron consequently is not quite so heavy. It has been expected that prices would drop, but the market holds at about 1.40c., Youngstown, for the material, although a choice specification would bring the price considerably below that figure, perhaps to the basis of Steel. It is too soon after the reduction in the price of Billets for any material change to have been seen in the Status of the Sheet trade. However, a reduction in the price of Sheets has been daily expected, both buyers and sellers holding off. The cost of conversion, with Billets at the old price, prevented the smaller mills from making much money, especially those which had to depend upon the open market for their Steel. The report now is that a horizontal reduction is to be made in Sheet prices by the larger interests to shut out the smaller producer. All mills are selling at bottom prices, and running on a very narrow margin of profit. The market holds nominally at 3.05c. for No. 27 Black Sheets, out of stock; 2.75c. for No. 27, one pass cold rolled, in car lots, at the mill; 2.20c. for No. 14 blue annealed, in car lots, at the mill, and 4c. for No. 27 Galvanized Sheets, out of stock. The market, however, is not represented by these quotations, being much lower. The announcement last week that the price of Billets had been reduced from $27.50, Cleveland, to $23.50, Cleveland, for 4 x 4 Bessemer did not bring out the volume of business which it was supposed would be the case. It diverted some

of the trade which had been done with the independent mills at $26, Cleveland, to the association mills, but there was but a slight change otherwise. There has been some tonnage covered at the new price, but not a very large amount of it. The Plate and Structural trade has been very dull, and the tonnage covered has hardly been appreciable. The conditions in the lake trade this fall are not conducive to the ordering of any new ships at the old price of Steel, and that avenue for business seems to have been effectually closed when the associated mills announced their firm adherance to the prices on those materials. The smaller tonnage, which was holding off for a reduction in the price of Rails, has not been influenced by the action of the Steel mills, the market still being dull in that respect.

Old Material.—The market has been extremely dull and sagging. Busheling and Stove Plate have been about the only active materials during the week. The whole market has moved down slightly on very light trading. We quote, nominally, all gross tons: Old Steel Rails, $15.50; Old Iron Rails, $18 to $19; Old Car Wheels, $16 to $17; Railroad Malleable, $13.50 to $14.50; Cast Borings, $6 to $6.50. All net tons: No. 1 Railroad Wrought, $12 to $13; No. 1 Busheling, $10.50 to $11.50; Wrought Turnings, $8 to $9; Iron Car Axles, $22; No. 1 Cast Scrap, $12 to $13; Stove Plate, $11.

Cincinnati.

FIFTH AND MAIN STS., November 11, 1903.—(*By Telegraph.*)

There is as little doing as seems possible in the Pig Iron market. What activity there is is mainly in Southern Irons for nearby delivery. A few buyers are placing orders to cover moderate wants for the next four months, but furnaces are not pressing for such business, and seem to regard it as a special concession to good customers. A few large buyers are in the market for round lots of Iron, but in every case they appear to be seeking still lower prices. While there may be some few selling agents who, when buyers reject a proposition at current rates, ask them to submit an offer 25c. lower, yet no one seems to recognize a lower basis in actual trading than the figures given in last week's *Iron Age*. Those quotations appear to very fairly represent the market. The outlook is for continued dullness. Freight rates from Hanging Rock district to Cincinnati, $1.15, and from Birmingham, $2.75. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1	$12.75 to $13.25
Southern Coke, No. 2	12.25 to 12.75
Southern Coke, No. 3	11.75 to 12.25
Southern Coke, No. 4	11.25 to 11.75
Southern Coke, No. 1 Soft	12.75 to 13.25
Southern Coke, No. 2 Soft	12.25 to 12.75
Southern Coke, Gray Forge	10.75 to 11.25
Southern Coke, Mottled	10.75 to 11.25
Ohio Silvery, No. 1	18.15 to 18.65
Lake Superior Coke, No. 1	15.65 to 16.15
Lake Superior Coke, No. 2	15.15 to 15.65
Lake Superior Coke, No. 3	14.65 to 15.15
Car Wheel and Malleable Irons.	
Standard Southern Car Wheel	$20.75 to $21.25
Lake Superior Car Wheel and Malleable	20.00 to 20.50

St. Louis.

CHEMICAL BUILDING, November 11, 1903.—(*By Telegraph.*)

Pig Iron.—On account of consumers in this territory getting down to such a low condition of supplies it is said there has been a little quickening in the demand, but the covering movement has not been in important volume for extended shipment. The inquiry has also been better, and among it have been requests for prices on some round lots. Quotations as low as $9.50, Birmingham, for No. 2 Foundry, and sales have been negotiated on this basis. We quote, f.o.b. St. Louis, as follows:

Southern, No. 1 Foundry	$13.25 to $13.75
Southern, No. 2 Foundry	12.25 to 12.75
Southern, No. 3 Foundry	13.25 to 13.75
Southern, No. 4 Foundry	11.50 to 12.00
No. 1 Soft	12.75 to 13.25
No. 2 Soft	11.75 to 12.25
Gray Forge	12.75 to 13.25
Southern Car Wheel	21.25 to 21.75
Malleable Bessemer	17.50 to 18.00
Ohio Silvery, 8 per cent. Silicon	22.00 to 22.25
Ohio Strong Softeners, No. 1	18.00 to 18.50
Ohio Strong Softeners, No. 2	17.50 to 18.00

Bars.—The quotation continues at 2c. from store for both Iron and Steel Bars, and the jobbing trade are handling a moderate volume of demand on this basis.

Rails and Track Supplies.—The general volume of demand and inquiry the past week is said to have been of a quiet order. We quote as follows: Angle Bars, 1.95c. to 2.05c.; Bolts, with Square Nuts, 2.80c. to 2.90c.; with Hexagon Nuts, 2.95c. to 3.05c.; Spikes at 2.05c. to 2.15c.

Angles and Channels.—The jobbing trade have handled a very fair volume of demand, and inquiry for this class of material and quotation of 2.15c. to 2.25c. from store is quite general.

Pig Lead.—The market lacks activity, and a small order of sales are reported for the past week. Quotations lower, with 4.20c. to 4.25c. the prevailing prices.

Spelter.—A very moderate total of sales the past week, with quotation nominally 5.25c.

Pittsburgh.

PARK BUILDING, November 11, 1903.—(*By Telegraph.*)

Pig Iron.—We can report a considerably better inquiry for Foundry Iron in the past few days, and a number of sales aggregating 1000 tons or more have been made. Northern No. 2 Foundry is held at about $14.25, Pittsburgh, while Southern No. 2 is quoted at $9.50, Birmingham, equal to $13.85, Pittsburgh, and we note sales of about 500 tons at this price. It is believed that prices of Foundry Iron are very close to cost of production, even to best equipped furnaces, and it is hardly likely that prices can go much lower than they are now. A Western interest is reported to have sold 8000 tons of Southern No. 2 Iron for prompt delivery at about $9.50, Birmingham. There is not much doing in Bessemer Iron, and while the furnaces in the Bessemer Furnace Association are reported as holding their Bessemer Iron at $15 at furnace, outside interests are shading this price from 50c. to 75c. a ton, and Bessemer Iron has been sold in small lots at $14.25 to $14.50, Valley, equal to $15.10 and $15.35, Pittsburgh. We note a sale of 500 tons of Bessemer Iron at about $15, delivered, Pittsburgh. Forge Iron is very quiet, and Northern brands are offered at $13 to $13.25, Pittsburgh. Southern brands are offered as low as $12.50, Pittsburgh.

Steel.—Another meeting of the Billet Association is in session in New York at this writing, and the outcome of it is being anxiously awaited. It is understood that certain details that may seriously affect future operations of the pool were not arranged at the meeting last week, and this is the reason why a second meeting is being held this week. There is more or less friction among the Billet mills, but it is hoped this will be removed at the meeting to-day, and the Steel trade be put on a firm basis. We quote prices adopted last week, which are $23 for Bessemer and Open Hearth Bars, $24 for long Bessemer or Open Hearth Sheet Bars and $24.50 for Bessemer or Open Hearth Sheet Bars cut to lengths. Very little Steel is moving, and demand will likely be small until some of the uncertainties now surrounding the actual condition of the Steel trade have been removed.

Hoops and Bands.—The three leading mills making Hoops and Bands have made a reduction of $5 a ton in prices, and we now quote Steel Hoops 1.65c. in 250-ton lots and over, and 1.75c. in carloads. Bessemer and Open Hearth Bands are now 1.30c., extras as per Steel Card. This is a reduction of $6 a ton on Bands.

Structural Material.—At the meeting of the Beam Association, held in New York on Tuesday, it was decided to reaffirm the price of Structural Material, which remains on the basis of 1.60c. for Beams and Channels up to 15-inch; over 15-inch 1.70c.

Plates.—Official information has just been received here that the Plate Association in session in New York has reaffirmed prices on Plates on the basis of 1.60c., Pittsburgh, for Tank, ¼-inch and heavier.

Shafting.—At this writing the Shafting Association is in session in the Hotel Schenley, this city, and while a reduction in prices may be made the impression prevails that present prices, which are 47 per cent. off in carloads and 42 per cent. in less than carloads, will be reaffirmed.

(*By Mail.*)

To say that the Steel trade has been seriously disturbed by the heavy cuts made in Billets and Steel Bars, and the further reduction in prices that will likely be made this week on Plates, Structural Steel, Shafting and perhaps Sheets and Tin Plate, is putting the case very mildly. For some time it has been recognized that a lower range of values of Pig Iron, Steel and Finished Material was imperative, as all efforts to induce the trade to come in and place contracts by guaranteeing prices were without result, and for three months the trade has been buying from hand to mouth, and the amount of new tonnage being placed has been pitifully small. Several months ago, when the Billet makers got together and fixed the price of Bessemer Billets at $27 and Open Hearth at $28, it was expected this would put the Steel market in good shape and that consumers would place some contracts. It was soon found, however, that these prices were not attractive, and the outside Open Hearth plants shaded them just enough to take nearly all the new tonnage that was being offered. Some of the mills in the agreement also shaded the fixed prices, and recently it looked very much as though the Steel market would be an open one. However, at the solicitation of the leading interests, a meeting of the Billet mills was held in New York City on Wednesday and Thursday of last week, and after a protracted and somewhat

stormy session it was finally decided to put the price of Bessemer and Open Hearth Billets at $23, Pittsburgh, Wheeling and Valley delivery; Long Sheet Bars, Bessemer or Open Hearth, $24, and Cut Bessemer or Open Hearth Bars, $24.50. At first the Clairton Steel Company refused to join the agreement, but it is understood have since consented to do so. While a cut of $4 a ton in Bessemer Billets and $5 in Open Hearth is a heavy one, yet it is a question whether it is deep enough and whether it would not have been better to have made a still further cut, so that the outside Open Hearth plants would not have been able to go into the market and buy Pig Iron and Scrap, which are now selling at low prices, and make Open Hearth Billets and Bars at a price that will allow them to slightly undersell the new prices adopted by the pool. There is a very general feeling that the cut is not deep enough, and that still lower prices on Billets must be made before the trade will come in and buy freely. Bessemer Pig Iron is selling at $14.25 to $14.50, Valley, or say about $15, Pittsburgh. A well equipped Open Hearth plant can buy Bessemer Iron and Heavy Melting Stock at prices that will permit it to make Open Hearth Steel and sell it in the open market at less than $23 a ton and still have a slight profit. The cut of $6 a ton in prices of Steel Bars, or from 1.60c. to 1.30c., is in the right direction, and the new price on Steel Bars is a conservative one and ought to have the effect of causing consumers to come into the market and place their contracts. To-day (Tuesday), the Plate and Beam Associations are having a meeting in New York, and it is the general expectation that the price of Plates will be reduced to about 1.40c. and Structural Steel to 1.50c., base. The Shafting Association meets in the Hotel Schenley, Pittsburgh, tomorrow (Wednesday), and it is probable prices of Shafting will be reduced to 52 off in carloads and 47 in less than carloads, which would be a reduction of about 10 per cent. No official announcement has yet been made of a reduction in prices of Sheets or Tin Plate, but it is expected that any day the list price of the leading interest on No. 28 Black Sheets, which is 2.75c., will be reduced, as the market has settled down to about 2.50c. for No. 28, and it is expected that if a reduction in prices is made it will be to the basis of about 2.50c. for No. 28, or perhaps slightly lower. The whole Iron trade, from Pig Iron to Finished Material, is undergoing a reorganization in prices, and until this reorganization has been completed it cannot be expected that tonnage will show any material increase. A concession of 5c. a keg in Wire Nails is now being made by the Wire mills, which are quoting on the basis of 1.95c., Pittsburgh, in carloads.

A meeting of the Pig Iron Committee was held in this city on Friday, November 6, and reports were received from Pig Iron producers in the Central West, embracing Pittsburgh and vicinity, the Wheeling district, the Mahoning and Shenango valleys, Southern Ohio, Columbus and Cleveland, that production in October was 35 per cent. less than capacity. On November 1 statistics and information showed a reduction of 49 per cent. less than capacity. It is believed this 49 per cent. reduction will hold through November, as a number of the furnaces will blow out during this month. It is estimated that output of Pig Iron in October will show a falling off over September of at least 250,000 tons, while for November it is expected to show a falling off of about 400,000 tons.

The Duquesne Steel Works of the Carnegie Steel Company are now in operation to nearly full capacity, and the Bessemer plant of the Republic Iron & Steel Company, at Youngstown, which was idle for about a week, started up Sunday night, November 8. The Sharon open hearth plant and the New Castle Bessemer plant of the Carnegie Steel Company are both idle, and will likely be down for some time. The Bessemer department at the Homestead Steel Works is also idle, but the Open Hearth department is running. The Edgar Thomson Steel Works is in full operation on Rails, and output at this plant last month was the heaviest of any one month in the history of the plant.

Muck Bar.—In sympathy with other lines prices of Muck Bar are weak and lower. The best local makes are being offered at $25, but on a firm offer it is probable $24 or lower could be done.

Plates.—Tonnage in Plates has been very light for some time, consumers refusing to place contracts, fearing that prices would not hold; but, on the contrary, have been buying from hand to mouth for some months. Some of the largest Plate mills in the Pittsburgh district are either idle altogether or else are running only partly full. It is hoped that with a material reduction in prices demand for Plates will show improvement. Prices that are in effect at this writing, but which are liable to be reduced at the meeting which is in session, are as follows: Tank Plate, ¼-inch thick and up to 100 inches in width, 1.60c., at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottoms Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price up to 3c. Plates more than 100 inches in width, 5c. extra per 100 lbs. Plate 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms net cash in 30 days.

Iron and Steel Bars.—At a meeting of the Steel Bar mills held last Friday a cut of $6 a ton was made in prices of Steel Bars, or from 1.60c. to 1.30c., Pittsburgh, in carload lots. The usual extras for smaller lots still apply. Demand for Steel Bars for some time has been very light, as a reduction in prices has been anticipated by the trade for some time and orders have been from a hand to mouth character. As to whether the trade will now come in and place contracts at the new price remains to be seen. Based on Billets at $23, the price of 1.30c. on Steel Bars can be considered a conservative one. It will be impossible for small Bar mills that have to buy Billets in the open market to roll them into Steel Bars and compete at the new price. Prices of Iron Bars are weak and demand is light. A number of the mills of the Republic Iron & Steel Company, who are regarded as the largest single producers of Iron Bars, are either idle or else are running only partly full. We quote Iron Bars at 1.30c. for very desirable orders, and 1.35c. for ordinary specifications. We quote Steel Bars at 1.30c., Pittsburgh, in carloads and larger lots. For quantities less than 2000 lbs, and not less than 1000 lbs., the price is 1.40c., and for less than 1000 lbs. the price is 1.50c.

Steel Rails.—Despite reports to the contrary the Steel Rail mills have not yet officially reduced the price of Steel Rails, but, it is understood, will have another meeting this week to take action on this matter. Persistent reports are that John W. Gates is buying heavily of the securities of the Republic Iron & Steel Company, with a view of controlling that concern, and if successful a Rail mill may be built by the Republic Company at Youngstown. Some fair sized export orders are being placed, but very little domestic tonnage. At this time last year the mills had entered orders for more than 1,500,000 tons of Rails, but up to this time the actual tonnage entered is less than half this amount. It is the general expectation that a reduction in price of Rails is imperative, in view of the lowering of values on all kinds of Iron and Steel, especially in Billets. We quote at $28, at mill, for Standard Sections.

Ferromanganese.—No large contracts are being placed and demand is quiet. We quote English and domestic Ferro at $48 to $49, delivered, in large lots.

Rods.—As a result of the heavy cut in prices of Bessemer and Open Hearth Billets there has been a reduction in prices of Rods. We now quote Bessemer and Open Hearth Rods at $31, Pittsburgh.

Structural Steel.—Very little new tonnage is being placed, buyers holding off in view of the persistent reports of a lowering in prices of Structural Steel. We quote: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6, 1.60c.; Zees, 1.60c.; Tees, 1.60c.; Steel Bars, 1.60c., half extras, at mill; Universal and Sheared Plates, 1.60c.

Sheets.—While no official announcement of a reduction in price of Sheets has yet been made by the leading interest, it is the general impression here that lower figures on both Black and Galvanized will be announced within a few days. The outside independent mills have been gradually reducing their prices on account of being able to get cheaper Sheet Bars, and are now quoting No. 28 on the basis of 2.50c. and No. 27 at 2.40c., f.o.b. at mill for carloads. It is thought that if the leading interest lowers prices they will be to about the above figures. Prices on Galvanized Sheets have also been declining, and these are quoted at 75 and 7½ to 75, 10 and 10 off. Demand for Sheets is light, consumers holding off placing orders, feeling confident that prices would be lower.

Spelter.—Prices of Prime Western Spelter for spot shipment have declined, and we now quote at 5.45c. to 5.50c., Pittsburgh.

Merchant Steel.—A meeting of the Shafting Association is to be held in the Hotel Schenley, Pittsburgh, on Wednesday, November 11, when it is probable prices of Shafting will be reduced from 47 to 52 per cent. off in carloads, and in less than carloads from 42 to 47 per cent. off. Demand has been light for some time, buyers placing orders only for very small lots. Demand for Merchant Steel has also been quiet, the amount of new tonnage given out being exceedingly small. Prices, on the whole, are weak, and the trade are generally anticipating lower figures. We quote: Open Hearth Spring, 2.15c.; Tire, 1.70c.; Toe Calk, 2.15c.; Sleigh Shoe Steel, 1.75c.; Cutter Shoes, tapered and bent, 2.25c.; Plow Slabs, Bessemer, 1.90c.; Open Hearth, 2.10c.; Tool Steel, 6c. to 8c. for ordinary grades; Shafting is still quoted at 47 per cent. off in carloads and 42 per cent. in less than carloads in base territory, but these prices are likely to be reduced at the meeting to be held in this city to-morrow.

Skelp.—The market continues very dull, and prices are weak and somewhat lower, in sympathy with other lines.

We quote Grooved Iron and Steel Skelp at 1.35c. to 1.40c., and Sheared at 1.45c. to 1.50c., Pittsburgh.

Merchant Pipe.—There has been no official change in prices of Tubing. Demand keeps up fairly well, but is not as large as some time ago. The trade are buying cautiously, believing that the lower prices on Billets and Skelp may make a readjustment in prices of Tubing necessary before very long. On the smaller sizes of Pipe prices are being shaded about 5 per cent. or more for both Iron and Steel. Discounts to consumers in carloads are as follows:

	Steel.		Wrought Iron.	
	Black.	Galv.	Black.	Galv.
	Per cent.	Per cent.	Per cent.	Per cent.
⅛, ¼ and ⅜ inch	68	58	65	55
½ inch	70	60	67	57
¾ to 6 inches	75	65	72	62
7 to 12 inches	69	59	66	56

Merchant Boiler Tubes.

	Steel.	Iron.
1 to 1½ inches	42½	39
1¾ to 2½ inches	55½	38
2¾ to 5 inches	61	48
6 to 13 inches	55½	38

As noted above, prices on the smaller sizes of Pipe are being shaded more or less, but on 6-inch or larger are fairly firm.

Coke.—A meeting of the prominent Coke operators of the Connellsville, and outside regions as well, was held in the offices of W. P. Snyder & Co., in the Frick Building on Tuesday. About 30 concerns were represented, among them being H. C. Frick Coke Company, Hecla Coke Company, Bessemer Coke Company and other smaller concerns. It was decided to appoint a committee to devise some plan by which the entire Coke business will be handled in such a manner as to regulate both demand and prices. It is probable that a central selling agency will be establishd, all Coke sold in the open market to be handled through this agency. This committee consists of Thomas Lynch of the Frick Coke Company and United States Coal & Coke Company; Harry While, representing the smaller independent Coke operators of the Connellsville and Klondike Coke regions, William Darsie of the Hecla Coke Company, W. Y. Humphreys of the Bessemer Coke Company, W. J. Rainey of Cleveland, John M. Jamison of the Jamison Coal & Coke Company, and W. P. Snyder of the Oliver & Snyder Coke Company. This committee will try to devise some plan to put the Coke business on a better basis, as it is somewhat demoralized at the present time. Strictly Connellsville Furnace Coke is being freely offered at $1.75 a ton or lower, and 72-hour Foundry Coke at $2.50 a ton. Main Line brands of Coke are being offered at still lower prices. Out of a total of 27,820 ovens in the Upper and Lower Connellsville regions about 12,000 ovens are idle, and this number will be increased before the week is out. Output last week was less than 200,000 tons from both regions, a considerable faling off over the previous week.

Birmingham.

BIRMINGHAM, ALA., November 9, 1903.

The withholding of the actual facts concerning sales of Iron in some cases and their distortion in other cases makes it a very difficult matter to report the market satisfactorily. Rumors are plentiful, but actual facts are hard to obtain. There have been concessions in prices, but to what extent it is simply impossible to ascertain with any accuracy. The truth is, one has no sooner satisfied himself of being on the right lead as to prices and quantity sold than something comes to his ears entirely destroying the value of recorded information. There is no difficulty in obtaining information concerning outside values obtained. But when one probes for the bottom, there is so much wincing that his results are practically *nil*.

There is a uniformity in the reports as to the volume of business for the week. All the interests say that it showed an increase over that of the preceding wek. But if it is coming in the volume reported from other points, the secret is well kept by the furnace interests here, for they will not confirm the rose tinted accounts that are being sent out from other points. There is a very fair trade in Iron, but it is confined as a rule to small and medium sized lots, and, as has been the case for some time back, prompt shipment is enjoined with every order. There has been comparatively little buying for 1904 delivery; not because there has been a want of interest in that delivery, but because there is no disposition on the part of sellers to contract for that delivery. This means that they have some faith in the reaction of the market.

Your correspondent regrets that he cannot confirm the report as to the placing of the 15,000 tons of Gray Forge and 10,000 tons of No. 3 Foundry which the export trade so widely heralded. Had such sales been made there would first have been obtained a contract for ocean freight, and none is yet acknowledged. In the next place the interests that could and would take orders of this magnitude refuse to give it credence. One interest informed your correspondent that they had an offer for that amount for export and had declined it. It may be that the report had only this fact for a foundation. Cablegrams are of daily occurrence, and sellers and buyers are so near together that business must result. As an illustration, your correspondent was shown a cablegram from a British market offering 45 shillings for No. 3 Foundry as a basis. This is getting very close to a trade. There are several cablegrams out at this writing, and it is confidently anticipated that some of them will secure business.

As to prices being paid by the domestic trade, they range from $9.50 to $10.25, taking No. 2 Foundry as a basis. But what proportion of trade is secured by each price is one of those things no fellow can find out. It is safe to say that the lowest price named has not secured the lion's share of the Iron sold. A majority of the sales were made at $9.75 and $10. With No. 2 Foundry Iron at $9.50, the net price to the furnace for No. 3 Foundry would be $8.75 to $9. One would not count all the fingers of just one hand in naming the furnaces that are producing Iron at these figures.

At the Steel mill there is great activity. They have increased their capacity for output and are now turning out the largest amounts in their history. They have contracts calling for 60,000 tons of Steel Rails, divided between three railroads. The Louisville & Nashville has contracted for 30,000 tons, and the Southern for 25,000 tons, while the Alabama Great Southern has ordered 5000 tons, which are now being rolled for them. Some Rails were delivered some time ago and placed where their wearing qualities were severely tested. So far they have stood the test to the satisfaction of the parties interested, and no doubt exists now as to their staying qualities.

The Pipe Works report a rather freer inquiry than prevailed the preceding wek, which led to some business. Some contracts were made running into next year. Prices are unchanged and those given last week can be taken as a guide for this week.

There would be a heavy movement in Iron if cars could be promptly obtained. One order given by one interest last week was for 400 cars, but a part only could be otbained. Complaints on this score are plentiful and are on the increase.

The output of the furnaces now is undoubtedly less than the sales made, and the stock in furnace yards would be materially drawn upon if orders for cars were furnished as demanded.

Coal and Coke show no change since last report. The former varies in price from $1.20 to $1.65, and the latter from $2.75 to $3.50 to $3.75. The one represents Furnace Coke and the other Foundry Coke.

There is still some talk of furnaces going out of blast, but they are making haste slowly. The fact that so many in the Western districts have blown out is an encouragement to others to follow suit. So many have gone out that the hope may be indulged that there is just room for those that have not banked. So far, concerted action on this point has not been attained. Each one seems to be waiting for his neighbor to take the initiative. As it is, we are not going under full steam, and some are doing a little house cleaning and preparing to be governed by circumstances.

New York.

NEW YORK, November 11, 1903.

Pig Iron.—Current business is light, and the market is unsettled through the offerings of the Southern makers, whose low figures, however, the manufacturers of Northern Iron are not meeting. We continue to quote Northern No. 1 X Foundry, $15 to $16; No. 2 X Foundry, $14.25 to $15, and Gray Forge $13.75 to $14.50, tidewater. Basic is quoted $14 to $14.25, delivered, but Southern Basic is being offered considerably lower. Tennessee and Alabama brands are quoted $13.75 to $14.25 for No. 1, $13.25 to $13.75 for No. 2, and $12.75 to $13.25 for No. 3.

Steel Rails.—Contrary to reports current, the Steel Rail manufacturers did not at their last meeting reduce prices. A meeting is being held to-day, however, at which definite action may be taken. Current business is very light. The only interesting order in the market is for 30,000 tons for the Canadian Pacific Railway, over which there will probably be a sharp competition between the American and European makers.

Cast Iron Pipe.—Only a few orders came out in this vicinity during the past week. The largest reported called for a lot of about 300 tons. It is not expected that much more business will develop this fall. Carload lots of 6 to 10 inch are quoted at $29 per gross ton at tidewater and 12-inch upward $28. These prices are shaded on good tonnages.

Finished Iron and Steel.—Railroad companies have placed bridge orders, this week, amounting to about 3000 tons in all. The condition of the structural trade is indicated by the fact that this small tonnage came from three different railroads. All prospective pieces of work calling for large tonnages are hung up for a time, and a few have been definitely withdrawn from the market, on account of the persistent reports that prices may be reduced. It is worthy of remark that no complaint is made about prices

by consumers, as the rates which have so long prevailed are not considered high, but buyers are, of course, indisposed to place business if they believe that by waiting they will be able to save considerable money. The Blackwell's Island Bridge contract has been made the object of litigation in the local courts, a suit having been brought by a taxpayer to prevent the Bridge Commissioner from awarding the contract, on the claim that the revised plans are not legal, and that only the original plans prepared in 1899 are legal. The contract has been awarded to the Pennsylvania Steel Company. The demand for Plates has not been active, but small tonnages are being placed with considerable freedom. The associated Plate manufacturers held a meeting in this city on Tuesday, but decided after an animated meeting to leave prices unchanged. The manufacturers of Structural Material have also decided not to change prices. We quote, at tidewater, as follows: Beams, Channels and Zees, 1.75c. to 2c.; Angles, 1.75c. to 2c.; Tees, 1.80c. to 2c.; Bulb Angles and Deck Beams, 1.90c. to 2.85c. Sheared Plates, in carload lots, are 1.78c. to 1.85c. for Tank, 2c. to 2.10c. for Flange, 2.10c. to 2.20c. for Marine and 2.25c. upward for Fire Box. Refined Bars are 1.40c. to 1.60c.; Soft Steel Bars, 1.42½c. to 1.50c.

Old Material.—Railroad companies that refused to sell their accumulated Old Material when prices were several dollars higher than now are beginning to take what they can get. It looks as if this will be the only thing to do, since there is little hope of an early improvement in trade. Under the circumstances, prices are so unsettled that it is very difficult to make quotations. A buyer with cash can secure certain material at almost his own figures. Old Steel Rails in short lengths have been sold at $10 at buyers' mills. An error was made last week in quotations on Machinery Cast and Stove Plate, which were too low. Approximate figures are as follows per gross ton, New York and vicinity:

Old Iron Rails	$15.00 to $15.50
Old Steel Rails, long lengths	11.50 to 12.00
Old Steel Rails, short pieces	9.50 to 10.50
Relaying Rails, heavy sections	19.00 to 20.00
Old Car Wheels	12.00 to 13.00
Old Iron Car Axles	16.00 to 17.00
Old Steel Car Axles	15.00 to 16.00
Heavy Melting Steel Scrap	9.50 to 10.50
No. 1 Railroad Wrought Iron	13.00 to 14.00
Iron Track Scrap	11.00 to 12.00
Wrought Pipe	8.00 to 9.00
Ordinary Light Iron	5.00 to 6.00
Cast Borings	4.50 to 5.00
Wrought Turnings	7.50 to 8.00
No. 1 Machinery Cast	13.00 to 13.50
Stove Plate	9.50 to 10.00

The New York Machinery Market.

NEW YORK, November 11, 1903.

The most important event of the week and, in fact, for many weeks, was the action taken by the National Machine Tool Builders' Association yesterday to maintain prices. A report of the meeting at which this course was taken is printed in another column. It is held in the trade that this action will be of material benefit to not only the machine tool business, but also other machinery trade. Purchasers have been holding off for some time, thinking that there might be a decline in the prices of machine tools which would influence the market at large. The decision to maintain prices will therefore eliminate this element of doubt as to the stability of values, and considerable business, which has been held in abeyance awaiting the decision, will doubtless be placed.

The trade at large are very well pleased with the result of the discussion which the machine tool builders had on this question, and the opinion that an improvement in trade will result therefrom is universal. The machine tool builders who are now in this city are practically unanimous on one point which is very interesting at this time. They report a decided improvement in export trade. Of course, the increase in foreign business has not been sufficient to form comparisons with the conditions existing several years ago, but there seems to be a display of life in the increase of foreign purchasers which has not been in evidence for some time. The character of the machinery which is being purchased indicates activity along the lines of automobile and small engine building, particularly in Continental Europe. No orders of unusual importance are reported in the trade. Several of the large corporations who were expected to close on extensive lists of machine tools are, however, buying a few of the tools which they specify, and have been inquiring about prices in a way which seems to indicate that they intend placing larger orders as soon as they are satisfied that they will not be caught with high priced tools immediately before a decline. We understand that the General Electric Company are showing considerable more interest in the market than they have of late, and several machine tool merchants hope to see the orders placed which they have been holding back for a number of weeks.

W. C. J. Bartels, general manager of the Bartels Tin Mining Company, 1365 Third avenue, New York, is now in the city for the purpose of purchasing the necessary mechanical equipment for reducing the ore from their tin mines in Alaska to the metal. In all the company expect to spend about $100,000, and will make their purchases within the next month or two for immediate shipment around the Horn, so that it can go up to the mines as soon as navigation is open in the early spring. It is their intention to erect a 50-ton plant, and the requirements will include concentrating tables, stamps, ore crushers, complete steam power plant, wire rope tramways, &c. It is possible that they will also install a small machine shop for repair work. They claim to have large tin mines at Tin City, Cape Prince of Wales, upon which they have already spent about $65,000 in development work. The veins are opened up, and everything is ready for smelting, which they hope to be in a position to do by the middle of August. Their present equipment of mining machinery, including electric drills, gasoline engine, &c., was purchased in Denver, Col., but it is probable that any additions to these that they require will be bought in this vicinity along with the smelter outfit. The officers are: John Rehhauser, president; Eugene C. Bondy, secretary; George F. Anger, treasurer, and B. S. Morehouse, conuselor.

It is probable that within the next two or three months a fair sized list of machine tools will be issued by the Grand Trunk Railway system, who intend to erect a new round house and machine shop at Allandale, Ontario. The plans have not yet been completed, and just what their requirements in the way of mechanical equipment will be has not been determined. W. D. Robb, with headquarters at Montreal, is superintendent of motive power.

The Providence Steel Casting Company, Providence, R. I., who are erecting a large plant for the manufacture of steel castings, are in the market for cold saw cutting off machines and a considerable number of other tools for foundry use. They have purchased from the Reeves Engine Company, Trenton, N. J., two vertical cross compound 125 horse-power engines, direct connected to 75-kw. General Electric generators; Almy Water Tube Boiler Company, Providence, R. I., two 125 horse-power water tube boilers; Ingersoll-Sergeant Drill Company, Easton, Pa., one cross compound two-stage air compressors; P. H. & F. M. Roots Company, Connersville, Ind., two blowers; Whiting Foundry Equipment Company, Harvey, Ill., two cupolas and freight elevator. The Fort Pitt Bridge Company, Canonsburg, Pa., have the contract for the steel work for the main building, which will be 118 x 150 feet.

Presses, double seamers, squaring shears and a large quantity of various other tools for making tinware are required by N. B. Bertels, Son & Co., Wilkes-Barre, Pa., to replace those destroyed by the recent fire, which completely demolished their plant, entailing a loss of $100,000. The firm inform us that they will immediately proceed to rebuild the plant, erecting part of the buildings this winter and the balance in the spring. By January 1 they expect to be able to start the manufacture of one or two lines, and will gradually increase until the plant is in full working order. No orders for machinery have as yet been placed.

Foundry equipment, including molding machines, trolley handling devices, &c., is required by the American Steel Casting Company, Chalifax Building, Birmingham, Ala., who are erecting a foundry, 50 x 150 feet; machine shop, 60 x 80 feet, and pattern shop. The machinery for the machine and pattern shops has been secured. The company will manufacture gray iron castings, hardware specialties, &c.

The Montford Machine Casting Company, Baltimore, Md., have completed their new foundry on Montford avenue, near Chase street, the main building of which is 65 x 130 feet. The building is equipped with a ventilating system, electric traveling crane and other modern appliances. The crane was furnished by the Northern Engineering Works, Detroit, Mich. Cupola by the Whiting Foundry Equipment Company, Harvey, Ill.; rumblers by the Paxson Company, Philadelphia, Pa.; elevator by John B. Adt, Baltimore, Md.; engine and boiler by Chandler & Taylor, Indianapolis, Ind.; emery grinder by the Fairbanks Company, Baltimore, Md.

Bids for the following material for the Portsmouth and Boston navy yards will be opened November 17 at the Bureau of Supplies and Accounts, Navy Department, Washington:

Class 14. One upright molding machine.
Class 15. One horizontal automatic feed hollow chisel mortiser.
Class 16. One universal cutter and tool grinder.
Class 17. One stove pipe forming machine.
Class 18. One wet grinder.
Class 19. One combined punch and shear.
Class 20. Three electric traveling cranes.

The proposals for supplies for the League Island and Washington navy yards, under opening November 17, include Class 18, punch, forging machine, slitting shears, reamer, &c.

Final awards for the Portsmouth and Boston navy yards under bids opened October 13 have been made as follows:

Drew Machinery Agency, Manchester, N. H., Class 20, one single punching machine, $530; Class 21, one single shearing machine, $530.

Niles-Bement-Pond Company, New York, Class 23, one motor driver plate planer, $3450.

Proposals were opened at the District Building, Washington, October 31, for furnishing one vertical triple expansion crank and fly wheel condensing pumping engine of 2,500,000 gallons capacity, as follows:

Camden Iron Works, Camden, N. J., $44,128.
Allis-Chalmers Company, Milwaukee, Wis., $28,500.
Kilby Mfg. Company, Cleveland, Ohio, $22,750.
Holly Mfg. Company, Buffalo, N. Y., $19,950.

D. Davies has been appointed comptroller of the Crow's Nest Pass Coal Company of Toronto, Canada, with offices at Fernie, British Columbia. His duties include those of purchasing agent, and trade catalogues will be gladly received by him.

The Niles-Bement-Pond Company, New York, were awarded the contract for class 23, one horizontal boring, drilling and milling machine, under bids opened at the Navy Department, Washington, October 20, for Mare Island and Puget Sound Navy Yards. Their bid was $7390. Class 24, one double steel plate planing mill exhauster and one motor and controlling panel will be purchased in open market.

Electric blowers and exhausters are included in the supplies for Mare Island and Puget Sound navy yards, bids for which will be opened at the Navy Department, Washington, November 24.

The Buffalo, Rochester & Pittsburgh Railway Company, Rochester, N. Y., inform us that they have purchased the equipment for their new shops, now being built at Salamanca. There is no truth in the report that they are having trouble with the foundations of their large shops at Du Bois, Pa., and contemplate moving them to another location.

Metal Market.

NEW YORK, November 11, 1903.

Pig Tin.—The market has been weak, both here and in London, with declining prices and continued disinclination of consumptive interests to buy more metal than is needed to cover current requirements. The demand from the interior has been very light. There is an evident lack of confidence among purchasers, notwithstanding that the statistical position of Tin has improved rather than the reverse. The closing prices to-day were 25c. to 25.10c. for spot and November, and 25c. to 25¼c. for December. The London market cables £115 5s. for spot and £116 2s. 6d. for futures, a decline of £3 for the week. Arrivals of Tin at Atlantic ports this month to date amount to 1167 tons, with 1130 tons afloat.

Copper.—In spite of a sharp advance in the London market, caused by the report of a strike at the Rio Tinto mines in Spain, the market here has shown no improvement during the week. Domestic purchasers are still buying on the most conservative scale, and the aggregate of transactions has been extremely light. Consumers seem to be well supplied for present and early future needs, and with want of confidence in the future they are not buying anything much ahead. With the report of the reopening of the Montana mines, a heavy break in prices occurred to-day, both in London and here. Lake, at the close, was offered at 13½c., Electrolytic at 13¼c. and Casting at 13c. The market, however, was nominal even at these prices, and closed with a weak and unsettled feeling. London closed to-day at £56 5s. for spot and £55 15s. for futures. Best Selected closed at £62 5s. Export business shows a slight gain this month.

Lead.—No change of importance has been developed in this market, except that the stringency which has prevailed for some time past in spot metal seems to be gradually easing off. Smelters are said to be shipping metal to Eastern markets on a rather more liberal scale, and the demand is less urgent. Spot metal is still firmly maintained, however, at 4.50c., and the American Smelting & Refining Company continue to quote Desilverized at 4.40c. for 50-ton lots and 4.42½c. for carload lots, New York delivery, shipment within 30 days. St. Louis reports 44.22½c. The London price at the close to-day was £11 1s. 3d.

Spelter.—A weak tone has developed in the Spelter market, and prices declined in sympathy with lower prices in London. Freer offerings from the West and continued light consumptive demand stimulated the downward tendency of the market. Spot in store to-day was nominally 5.75c., and on railroad 5.50c. November and December were quoted at 5.25c. St. Louis reports 5.15c. London cables £21.

Antimony.—The market is quiet but steady. Cookson's is quoted at 7c., Hallett's at 6¼c. and other brands at 5¾c.

Nickel.—No change is noted in this market, 40c. to 45c. being quoted for large lots, and 50c. to 60c. for smaller quantities.

Quicksilver.—The market is quiet but steady. Flasks of 16½ lbs. are quoted at $47.50. London cables £8 10s.

Tin Plates.—A cut of 20c. per box was made on Monday by the American Tin Plate Company in the price of 14 x 20, 100-lb. Cokes, with corresponding reductions in other classes of Plates. The reduction was not unexpected, in view of the recent declines in Bars and Pig Tin, and the falling off in the demand for Plates. Canners' wants having been supplied for the season, but little business is coming to the mills from that source, and the general demand is not heavy. Quotations are now made on the basis of $3.60 per box of 14 x 20, 100-lb. Cokes, f.o.b. mill, equivalent to $3.79, New York. Welsh Plates declined to 11 shillings 1½ pence, f.o.b. Swansea.

The United States Steel Corporation exported through New York and other Eastern seaboard ports last month nearly 11,000 tons of wire, wire nails and pipe, which were manufactured at the plants in Pittsburgh and vicinity by the American Steel & Wire Company and the National Tube Company. October shipments abroad represent an increase of some 65 per cent. compared with similar exports during September, when but 6500 tons were exported. The largest export shipment of wire last month went to Australia, 3276 tons out of the total consignments of 6826 tons sent abroad. South America was next, with 1400 tons. To Europe 487 tons were shipped. Practically all of this went to British ports. The wire nail exports last month aggregated 2578 tons, as compared with 1443 tons for September. The shipments to Great Britain and the Far East were the heaviest. To British ports 728 tons were forwarded. To China and Japan 622 tons in four lots were shipped. Three hundred and eighteen tons went to Australia. South Africa was exported 206 tons in seven lots. South America was a purchaser to the extent of 177 tons. Chili took 147 tons and the Argentine Republic the balance. One Hundred and sixty-five tons went to Alexandria, Egypt. Shipments of wire nails were sent last month. The pipe exports aggregated 2396 tons, as against 1448 tons for September. Europe was the biggest buyer, in October 1022 tons going to that part of the world. Continental Europe took 931 tons. To British ports 691 tons were forwarded. Two hundred and sixty-eight tons went to Sydney, Cape Breton. Japan was sent 171 tons in three lots. One hundred and eight tons went in a single shipment to Australia. Mexico was forwarded 118 tons.

Along the lines of general retrenchment which is being indulged in by the large railway systems, the Baltimore & Ohio and the Union Pacific roads announce that they will reduce the working hours at their car shops. The Baltimore & Ohio Railroad has reduced the working hours of the various car and locomotive shops to conform with a similar cut made in the maintenance of way force. This is a reduction from a ten-hour day to a nine-hour day, similar to the reductions made by various other railroads in their working forces. Instead of reducing the number of men employed it was thought better to retain all the men and make a horizontal reduction in the hours of work, which is also reflected in the pay. About 5800 men employed in the locomotive department and 2100 men in the car department are included in the reduction. The Union Pacific Railroad Company will, it is reported, cut their shop force to just one-half of the present number.

The machine tool business of the Pittsburgh Shear, Knife & Machine Company, Pittsburgh, Pa., has been purchased by the Erie Foundry Company, Erie, Pa., who will hereafter manufacture the tools at their plant in the latter city. It is understood that last year's business of the Pittsburgh Company in that branch alone amounted to between $100,000 and $150,000. The Erie Company intend to increase their facility and will greatly extend the newly acquired line. There is no truth in the report that the forge, shear and knife business of the Pittsburgh Company had also been sold to the Erie Foundry Company.

The Gorham Mfg. Company, New York, will erect a ten-story building at 225-227 West Twenty-sixth street, on a plot, 36 x 98 feet. The lower floor of the building will be used for the storage of automobiles and the upper part for manufacturing purposes.

The Future of the Machine Tool Trade in the United States.*

BY WILLIAM LODGE, CINCINNATI, OHIO.

The future of the machine tool trade in the United States is a subject upon which all of us are vitally interested. The last two years have shown wonderful changes and developments in the power applied to a lathe, both in electric drives and also in belt power. I have no doubt that our neighbors on the other side of the pond are just as much alive on the subject as we are, and while they may not develop anything so wonderful as to be able to market it on this side in the face of the tariff, still unless we are on the alert they may secure the markets of the world, and the markets of foreign countries will become, in a very near future, the most important markets for the output of the factories of this country. It is very necessary, therefore, that we should become as keenly alive to the situation as its importance merits. There is more need to-day of weight and power for machine tools than ever before, and the calls made upon them by reason of the advent of high speed steels, keep us in a state of uncertainty as to where the limit will be. In the manipulation of steel the high speed tool steel is applicable to almost all ordinary operations in the shop, and even the speed at which cast iron may be turned is double what it formerly was, calling for double the power in the machine. However, for this class of work it may not call for double the weight, because heretofore lathes have been used indiscriminately, both for cast iron and for steel. It appears to the writer that the future will call for two distinct classes of machines, in order to meet the strenuous demands made upon them. One of these will be for the manipulation of steel, and the other one of cast iron. It will be necessary that both of them be designed so as to receive individual motor drives.

Standardizing.

It would be to the interest of this association, if it could possibly be brought about, that some standard be adopted. Why may not all manufacturers of machine tools have the same size of general bearings, the same size of nose for the lathe spindles for the different sizes of lathes, so that our customers may find it easy to transfer face plates, chucks and tools from one machine to another, irrespective of who may have been the manufacturer. If this matter can be brought about we shall be the first country to have adopted a uniformity. This would be a most important matter, not only to ourselves but to the men to whom we sell, and it would, at least, have the effect in foreign countries of securing preference for American tools, because of their interchangeability at certain points and because of their uniformity in weight and power. I do not advocate uniformity in the design of the machines throughout, and I know it is utterly impossible to secure uniformity in the quality of the work put into the machines, but it will be of great assistance to incorporate the features mentioned wherever possible. If the salesmen for the different houses were attempting to get trade in either Europe, Asia or Africa, and the statement could be made that chucks and tools could be interchanged from one machine to another, no matter who the maker was, it would be bound to result in a preference for American goods. As we are all likely to have to make new designs, it would be well if it were possible to bring about this interchangeability. Would it not also be well to establish uniform widths and diameters for countershaft pulleys and for the countershaft itself, because these vary so much as to appear ridiculous at times?

The future market of the United States is going to be the world, and if we can make the world understand that every article of commerce that passes from this country to another, at least in our line, shall be thoroughly worth the money charged for it, shall we not by this means secure their confidence and with it their future business?

* A paper read before the New York meeting of the National Machine Tool Builders' Association.

Uniformity of Terms.

In addition to this if some uniform arrangements could be made, establishing the terms upon which American goods could be bought by foreign houses, we should be doing a service to the whole United States, as there is always a tendency on the part of concerns with large capital to grant terms against which the man with small capital finds it a hardship to compete. It is purely a question of making the matter understood in the first place, and afterward having peace and uniformity in this particular.

How often we find here in our own country that goods are sold on long time. The buyer, of course, is always entitled to every advantage possible, yet there is nothing more ruinous to the manufacturer than these long time payments. In the clothing business, the dry goods business, the shoe business, it is not an uncommon thing for goods to be shipped out, say, January 1, the bills dated April 1, terms six months beyond that, with possibly 5 per cent. discount for cash. As competition becomes keener in machine tool lines similar conditions are likely to be brought about unless something is done in the early stages looking toward payments being made within, at most, 60 days. Thirty days would be preferable, and best of all would be a sight draft with the bill of lading, in which case the goods would be paid for before leaving the shipping point.

Necessity for Foreign Market.

I believe that the acceleration of speeds and feeds and the general advancement in manipulation of metals, in addition to the large extensions that have been made by tool builders, will enable us, when our factories are all running full, to more than meet the wants of all of our customers. We must then either run with less men or for fewer hours per day, or look for foreign markets. We are all well aware of the economy of running our shops full handed and at full time. I have found in our own experience, year by year, comparing the total expenses of all descriptions with the entire pay roll, that the fixed expense has ranged from 55 to 140 per cent. I mean by this that, with a large fixed expense and a very small output, the expense is likely to reach anywhere from 100 to 140 per cent. of the pay roll, while with the same fixed expense and a very large output, the expense may come down to 50 per cent. of the pay roll. All of these items are matters of interest to this association, and if action can be taken looking to uniformity of design and, approximately, of weights, to interchangeability of certain parts and to a proper set of terms arranged for the foreign business, we shall all profit by it.

Maintenance of Prices.

It is frequently said that a gentleman's agreement could never be carried out. This is a sad commentary on the American character, and if the Machine Tool Builders' Association could be the first of all the associations to actually and truly live up to such an agreement as this, what an example to the world it would be! How unfortunate, how ruinous and, I might say, how almost idiotic is the voluntary reduction of price by single individuals! Every manufacturer knows quite well that a reduction of price by one manufacturer means that this price shall be made by another one; that every dollar taken from the selling price comes from the profit, and that no more goods are sold as a result of a reduction in price. The reduction merely gives the party who sells at a low price a temporary advantage over his competitors, but by his action he gives to the consumer a portion of the profit, and possibly compels a hundred other manufacturers, unwillingly, to meet his cut in price.

If there is a necessity—and I admit that such necessity may come—for a reduction in price, why may we not make a uniform reduction? This would at least let the customer know when he touched bottom, while if each individual permits the customer to hammer down in the price the customer is really more unhappy than the manufacturer, because he is never sure whether he has bought his goods at the right price. When the price of iron is almost cut in two, and the price of labor averages less, it stands to reason that goods may be sold propor-

tionately lower without injuring the profiits. The men who buy tools know this just as well as we, and they are a little restless if they are called upon to-day to pay as high a price as when pig iron was double the present price. Would it not be better, therefore, to recognize this as a fact and give the customer the benefit of the difference in cost, so far as the prices of labor and material are concerned, since competition compels the customer to do this in his own business? If the association could have it sufficiently well impressed upon the members that the necessity for only a given amount of reduction is as important as was our former given amount of advance, would it not accrue to the benefit of the whole association? Is there not a sufficient field for every member of this association to preach this gospel, not only to its own members, but to nonmembers in the same line of business? Every article of merchandise is worth what is uniformly asked for it by all the different venders, but if one vender can make a price of 5 per cent, less than another one, and still another party sells the same article for 10 per cent. less, the customer is always uncertain whether he is getting the goods at the right price. We are all well aware that the margin of profit is already down to a low figure, and anything that we can do to stop ruinous cutting will undoubtedly result to our advantage.

The National Machine Tool Builders' Association, if all its members will work honestly and faithfully, with the end in view of benefiting each of its members, is capable of providing the means of making each individual business much more profitable than it has ever been before. Ours is a combination wherein each and every plant is handled in most departments by the men who built them from the ground up, this arrangement giving advantages that could not possibly be obtained by such a combination as the United States Steel Corporation, in forming which a large number of plants was brought together hurriedly and, as the original builders sold out their interests, the resulting mass had to fall to the management of an entirely different set of men. While great economies were possible in the marketing of the goods, there was great lameness in the management of the manufacturing features. This leaves the principal advantage in the possible control of the market for selling; our combination has all the possibilities for controlling the selling price, provided all of our members have sufficient good will, honesty of purpose and faith in one another to name prices and stand by them. What matters it to each individual manufacturer if the price of any one manufacturer is 5, 10, 15 or 20 per cent. lower than any other one, so long as all the members know just where that price is? Each machine will take its place in the market as being of the value asked for it, and if all the other members are so honest that we may always know where the price is, it then becomes a question of how well the goods are worth the price asked, and of the salesmanship of the men employed to sell the goods. We will meet with some difficulty in establishing prices on electrical drives, but a free intercourse with each other would probably enable us to line up this feature so as to avoid serious losses. I do not advocate an abnormally high price, because of the necessity of our doing a large export business. If our prices are too high we will be shut out of the export market, but if we can prevent their becoming any lower it will be of undoubted advantage to us all.

Iron and Industrial Stocks.

Holders of iron and steel stocks, who had been hoping that severe liquidation was ended, were rudely disturbed on Thursday by renewed selling of United States Steel shares which carried all prices down. The preferred lost 2⅞ and the common 1¾, as compared with closing prices on Wednesday, transactions in the preferred aggregating over 141,000 shares and in the common 60,000 shares, a total of over 200,000 of both issues. The new 5's also declined, selling under 67. Republic common fell 1 below the previous day, the preferred 1⅛; Car & Foundry common 1, preferred 3; Pressed Steel common 1, and Tennessee Coal & Iron 1½. The attack on these stocks followed the announcement of the reduction in the price of steel billets. On the same day Chicago Pnuematic Tool shares declined to 20 in Chicago, although prominent interests in the company report earnings justifying the continuance of the dividend.

After such a day it was natural to expect a worse day to follow. On Friday the throwing over of enormous blocks of the Steel issues was resumed, transactions running over 225,000 shares of the preferred and 54,000 shares of the common. New low records were made, the common selling down to 10½, the preferred to 52, and the new 5's to 65¾. Wild rumors were circulated of the reduction in profits caused by the lowering of the prices of steel billets. Other industrials were also affected, Republic common selling down to 6¼, preferred, 48; Tennessee, 26⅝; Car & Foundry common, 18⅝; Locomotive common 12¼, preferred 74⅞; Can preferred, 26½. Chicago Pneumatic Tool recovered to 25 in Chicago.

United States Steel, preferred, was again the most active stock on the entire list on Saturday, transactions running up to 50,000 shares in the two-hour session, while the common was traded in to the extent of 15,500 shares. The preferred again touched its low record of 52, closing at 53¾, but the common only sold down to 10⅞, closing at 11⅜. The new 5's sold at 66¼ to 66¾. Colorado sold down to 27¾, Tennessee to 26⅝ and Enameling, common, to 16, but other industrials were under less pressure and sold at a slight advance on Friday's prices.

Monday proved to be another day of heavy pressure on the United States Steel stocks. The transactions in the preferred aggregated 188,000 shares, and in the common 38,900 shares. The preferred made a new low record of 50½, and the common a new low record of 10⅜, while the new 5's sold down to 65⅝. The transactions in the Steel stocks covered more than half of the total business on the New York Stock Exchange for the day. It will strike the thoughtful observer that if the heavy business in these stocks was due to genuine liquidation, the decline was remarkably slight, as the preferred only sold 1½ below its previous low record and the common only ⅛ below. The inference seems plain that the enormous transactions were largely due to the trading element on the Exchange and to the operations of the syndicate now converting preferred stock into bonds. The syndicate would, of course, be interested in keeping down the price of the preferred and in marketing the bonds. This would also explain the weakness of the bonds. Other iron and steel issues were affected to some extent. Colorado sold down to 27, but the pressure on this stock was possibly due to the coal strike in the Rocky Mountain regions which is now on. Tennessee sold down to 26¼, Republic, preferred, down to 49, Locomotive, preferred, down to 74, Car and Foundry, common, down to 19, and the preferred down to 65½.

On Tuesday there was a further slump. United States Steel, common, touching 10, transactions reaching 53,300 shares, while the preferred broke to 49¾, and sales of 229,850 shares, and the bonds went down to 65, sales aggregating $1,056,000.

The time for payment of the first subscription of the stock and bonds of the reorganized Consolidated Lake Superior Company was to expire on November 9. The subscriptions, however, have been coming in so freely that the committee have decided to extend the time until November 17. Those who have the reorganization in hand now feel confident of its success.

Referring to the affairs of the Chicago Pnuematic Tool Company, and the rumors that are going the rounds, President J. W. Duntley says: "The company have paid promptly all their interest and sinking fund charges on their bonded indebtedness. They have declared their dividends out of actual earnings, after writing off all expenses, fixed charges, and allowing liberally for depreciation of plants, &c. They have paid their dividends out of their own money. They do not owe a dollar of borrowed money. They have no floating indebtedness, except current monthly bills for material and supplies, which do not exceed $48,000, and these we are ready to pay promptly when due. The company have over $1,000,000 in quick assets over and above all current liabilities, including current bills, accrued interest, dividends, &c. Their net earnings for the past nine months are $513,224. Their present business, and the outlook for the future, is satisfactory in every way. Their European business is growing faster in proportion than the local business. The company are now selling their tools and machines in every civilized country in the world, and are no longer dependent on the American trade for their business. These are facts, and the company's record shows the payment of every obligation, no borrowed money, no current indebtedness, except their monthly bills, and a large surplus in quick assets. The regular annual statements will be made and published at the end of the year."

Dividends.—The People's Natural Gas Company of Pittsburgh have declared the regular quarterly dividend of 1½ per cent., payable November 14.

Niles-Bement-Pond Company have declared a quarterly dividend of 1½ per cent. on the preferred stock, payable November 14.

Pratt & Whitney Company have declared a quarterly dividend of 1½ per cent. on the preferred stock, payable November 14.

American Radiator Company have declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable November 14.

Pressed Steel Car Company have declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable November 25, and a quarterly dividend of 1 per cent. on the common stock, payable November 30. The fourth quarterly instalment of ¼ per cent. of the extra dividend of 1 per cent. on the common stock will also be paid November 30. Books for preferred stock close November 4 and reopen November 25; common stock close November 9 and reopen November 30.

The National Machine Tool Builders' Association.

A most successful meeting was the second annual convention of the National Machine Tool Builders' Association, held in New York, Tuesday and Wednesday, November 10 and 11. It was an extremely important meeting, as it was held under conditions which subjected the organization to the severest test, and it withstood it. All eyes in the machinery world were fixed upon the outcome of the discussions and deliberations which it was known woud come before the delegates, for upon their outcome depended the stability of the machinery market.

For weeks both buyers and sellers of machinery, and of course particularly machine tools, have awaited the verdict of these men, who by a large percentage constitute the machine tool building industry of this country. Purchasers have hoped that the declines which have recently marked the iron and steel market and other depressing circumstances, such as the drop in industrial securities, would influence the machine tool builders to reduce their prices. They have therefore withheld purchases of equipment temporarily, even though the machines were urgently needed. Machinery merchants were interested from the opposite side of the question, and also inasmuch as that they are practically all carrying large stocks of machine tools purchased at existing prices.

The machine tool builders were vitally interested, as a reduction in values anywhere along their line might result in a ruinous price cutting war and perhaps a disruption of their organization. Compared with the prices of raw materials even at their present level machine tools have not enjoyed a relatively wide margin of profit. When raw materials and labor were leaping up in wide strides only one advance was made by machine tool builders, and that amounting to but 10 per cent. when the prices of machine tools were really very low, and in fact materials were lower than they are at present.

It was these conditions that prompted the members of the association to take the stand which they did and maintain existing prices, for they argued that the decline in raw materials amounted to but a small fraction of the cost of the machines, and the labor element, the greatest of all in the building of machine tools, has not decreased in value.

Conservatism prevailed, and the sessions of the meeting were all most harmonious throughout. Discrepancies of opinion that may have prevailed at the outset of the meeting were soon swept away and long before the conclusion the members were one enthusiastic unit, believing that the maintenance of values at this time is most essential in order to preserve any semblance of order in their branch of trade, and that they were justly entitled to the small margin of profit which they were securing under present conditions.

The important action of the convention was the hearty and unanimous adoption of a lengthy resolution to maintain prices, which will be circulated in the trade and which summarized is as follows:

"The National Machine Toof Builders' Association, in convention assembled in New York this tenth day of November, 1903, declares that there is nothing in existing conditions to warrant a reduction in prices, and hereby resolves to maintain the present schedule of prices of machine tools."

As this matter was the vital point at issue, it was brought up for discussion immediately after the preliminary routine was disposed of. The members participated in the debate enthusiastically, and it soon assumed a one-sided form.

William Lodge, president of the Lodge & Shipley Machine Tool Company of Cincinnati, Ohio, delivered an address on "The Future of the Machine Tool Industry in the United States," which elicited sound applause and many supplementary remarks following out the lines suggested in the address. We print Mr. Lodge's complete paper in another column.

W. P. Davis, president of the W. P. Davis Machine Company of Rochester, N. Y., delivered an address, which we print in another column, on the topic "How Shall We Improve Trade?" This was also enthusiastically received, and Joseph Flather, president of the association, who has recently returned from an extensive tour abroad, enlarged upon the features which Mr. Davis mentioned in connection with export trade, coinciding with the views expressed by Mr. Davis.

P. E. Montanus, the association's secretary, delivered an extemporaneous address, which was decidedly interesting and won the loud applause and hearty commendation of the members. In a very able manner Mr. Montanus presented phases of the machine tool business which had never before appealed to many of the machine tool builders in quite the same light. He compared this branch of trade with several other sections of the machinery industry of this country, showing what far greater advantages were enjoyed by the latter in the matter of profits. He said that the growth of the machine tool industry was slow and steady as compared with the rapid development of many concerns who manufacture their product with the use of machine tools. The profits of the machine tool business, he said, were small, while the concerns manufacturing other lines were obtaining high prices for their product.

Following the custom inaugurated at the last convention, the members were divided into committees according to the type of machines they produced. Between sessions these committees met and discussed the questions which affected conditions in their particular line. At Wednesday's session they reported to the convention and were reappointed to continue their work until the next convention.

Joseph Flather, president of Flather & Co., Incorporated, of Nashua, N. H., presented a paper on the topic, "What Shall We Do on a Declining Market?" He said:

The situation at the present time is similar, in some respects, to that in the autumn of 1873. During the War of the Rebellion the value of paper money was inflated and everything measured by that standard became so high that firms doing business during that period made large profits, which, however, nearly all of them spent later on in enlarging their old shops or building new ones.

After peace was finally declared there was a brisk demand for goods to repair the waste caused by war. The railroad companies had new equipments, cotton mills enlarged their plants and the oil companies bought large quantities of machinery. There was a great deal of talk of prosperity, new companies were formed every day and people said the old methods of doing business had passed away; there would be no more serious depressions, there might be a lull occurring occasionally, but that would be the worst that could happen.

In the meantime the workmen began to ask "If there is so much prosperity where do we come in?" and in 1871 and 1872 they commenced to agitate for an eight-hour working day.

That was the situation in the fall of 1873, when a prominent Philadelphia bank failed, and we were facing a period of depression that lasted seven years. To make the situation worse, many of the debts were contracted at the time of the inflation of prices, and finally had to be settled in full when the value of the property was much less. All over the United States business was prostrated, and it seemed as if there never would be a revival of trade.

Although I said at the beginning that in some respects the situation is similar to 1873, in others it is altogether different.

We are not troubled now about the value of our money—a paper dollar is as good as a gold one, and more convenient. Although stocks have declined in value and severe losses have resulted to investors in the inflated companies, the conservative business and manufacturing houses have as yet suffered but little, and are well pre-

pared to tide over a period of dull times which we may have for a year or two.

It will be a good time at present to take soundings and see just where we are, to make improvements in our works and in our methods of manufacture, and if any of us have been overworked and driven too hard this is our opportunity to take a rest.

Our firm in times of depression have been fortunate in having some customers that have placed orders with us for special tools and machinery, and while we would have preferred making lathes exclusively, this special machinery helped to keep our workmen employed.

Probably all of the machine tool builders have customers willing to place such orders, and take advantage of the dull times to get work done that is difficult to place when everybody is busy.

Because business is dull it is not necessary to manufacture tools at a loss, and a fair margin of profit is needed on a declining as well as a rising market.

As far as machine tools are concerned, it does not seem as though there was any occasion for a reduction in prices at present.

The only advance made on lathes, shapers and drills was 10 per cent. above the previous low prices, and in the meantime we are paying much more for material and labor than when those prices were in force.

It seems to the reader that if we continue to work together, insisting on a reasonable price for our goods and not to be afraid of what others may say or do; to be firm, patient and of good courage, we shall be able to hold our own during any depression and be ready for business when it again revives.

As Mr. Flather declined the presidency of another term the Nominating Committee named the following officers for the ensuing year, and they were elected unanimously:

President, William Lodge, Lodge & Shipley Machine Tool Company, Cincinnati, Ohio.

First Vice-President, W. P. Davis, W. P. Davis Machine Tool Company, Rochester, N. Y.

Second Vice-President, F. E. Reed, F. E. Reed Company, Worcester, Mass.

Treasurer, Enoch Earle, P. Blaisdell & Co., Worcester, Mass.

Secretary, P. E. Montanus, Springfield Machine Tool Company, Springfield, Ohio.

It was decided to hold the next convention in Cincinnati, the date to be set by action of the Executive Committee.

The members and guests present were:

Joseph Flather, Flather & Co., Incorporated, Nashua, N. H.
P. E. Montanus, the Springfield Machine Tool Company, Springfield, Ohio.
H. G. Barr, Worcester, Mass.
C. E. Thwing, Draper Machine Tool Company, Worcester, Mass.
A. W. Whitcomb, Whitcomb Mfg. Company, Worcester, Mass.
W. A. Wilson, Wilson Machine Company, Rochester, N. Y.
W. P. Davis, W. P. Davis Machine Company, Rochester, N. Y.
Wm. Lodge, Lodge & Shipley Machine Tool Company, Cincinnati, Ohio.
S. A. Anderson, Cincinnati Shaper Company, Cincinnati, Ohio.
Enoch Earle, P. Blaisdell & Co., Worcester, Mass.
B. B. Quillian, Cincinnati Planer Company, Cincinnati, Ohio.
J. B. Doan, the American Tool Works Company, Cincinnati, Ohio.
D. A. Engstrom, Owen Machine Tool Company, Springfield, Ohio.
J. W. Carrel, Draper Machine Tool Company, Worcester, Mass.
Wm. A. Greaves, Greaves, Klusman & Co., Cincinnati, Ohio.
Wm. H. Owen, Owen Machine Tool Company, Springfield, Ohio.
Philip Fosdick, Fosdick Machine Tool Company, Cincinnati, Ohio.
W. D. Woolson, Jones & Lamson Machine Company, Springfield, Vt.
James Hartness, Jones & Lamson Machine Company, Springfield, Vt.
Fred. Holz, Cincinnati Milling Machine Company, Cincinnati, Ohio.
F. E. Reed, the F. E. Reed Company, Worcester, Mass.
V. F. Prentice, Prentice Bros. Company, Worcester, Mass.
C. Wood Walter, Cincinnati Milling Machine Company, Cincinnati, Ohio.
H. C. Hoefinghoff, the Bickford Drill & Tool Company, Cincinnati, Ohio.
R. K. Le Blond, R. K. Le Blond Machine Tool Company, Cincinnati, Ohio.
H. J. Hendey, the Hendey Machine Company, Torrington, Conn.
C. H. Alvoord, the Hendey Machine Company, Torrington, Conn.
E. M. Woodward, the Woodward & Powell Planer Company, Worcester, Mass.
Fred. L. Eberhardt, Gould & Eberhardt, Newark, N. J.
Oscar Flather, Mark Flather Planer Company, Nashua, N. H.
W. V. Gould, Jones & Lamson Machine Company, Springfield, Vt.
Robert Wuest, National Metal Trades Association, Cincinnati, Ohio.
A. Luchars, machinery, New York.
A. I. Findley, the *Iron Trade Review*.
D. H. McPherson, National Metal Trades Association, New York.
Wm. R. Wallis, *American Machinist*, New York.
Charles C. Johnson, New York *Commercial*, New York.
Fred. W. Schultz, *The Iron Age*, New York.

The National Founders' Association.

(*By Telegraph.*)

WASHINGTON, D. C., November 11, 1903.—The National Founders' Association are now holding their annual meeting at the New Willard Hotel, beginning their session this morning. The attendance is large, the registry showing 164 members enrolled, in addition to a number of guests. Preliminary to the meeting a banquet was given last evening, in which the present and past officers participated. H. N. Covell of Brooklyn was toastmaster. A feature of the occasion was the presentation of a diamond ring as a testimonial to John A. Penton, who is about to retire after serving the association for six years as secretary to the commissioner. He is to be succeeded by O. P. Briggs of the Minneapolis Steel & Machinery Company, Minneapolis, Minn.

The first session was called to order by Isaac W. Frank of Pittsburgh, vice-president, in the absence of H. Towne of Stamford, Conn., president, who has been seriously ill and is not yet well enough to leave home. Mr. Frank made an extemporaneous address, in which he referred with satisfaction to the immense amount of work done by the association since the last meeting, 218 cases of labor troubles having been settled in that time. Continuing, he spoke at considerable length on the purposes of the association. A letter from Mr. Towne was read, in which he expressed his great interest in the work, stating that the point had now been passed where employers' associations seemed desirable, or necessary, and the question is now, How can they be made most effective? He outlined a number of recommendations on questions of policy. Announcement was made that President Roosevelt would receive the members of the association Thursday afternoon. Treasurer John R. Russel of Detroit read his report, for which an Auditing Committee was appointed. Commissioner John A. Penton read his report, detailing the cases handled during the year. His preliminary remarks formed a strong presentation of the rights of employers and workingmen, respectively. A committee on Order of Business was appointed, consisting of H. N. Covell of Brooklyn, J. H. Webster of Cleveland and H. A. Carpenter of Providence. The Committee on Press comprised A. C. Pessano of Detroit and Thos. E. Durban of Erie. The Committee on Credentials comprised J. D. Leary of Cincinnati and H. Van Atta of New York. Secretary A. E. McClintock of Detroit read his report, showing that 111 applications for membership had been received in the year, while 61 members were lost by resignations, suspensions, failures or consolidations; a total of 579 foundry plants now hold membership. The association adjourned until Thursday morning.

We can state officially that the report that the Republic Iron & Steel Company are negotiating for the purchase of the plant of the Youngstown Iron Sheet & Tube Company, at Youngstown, Ohio, and the blast furnace at Sharpsville, Pa., together with ore and coal lands of the latter concern, is untrue. No such deal is under way.

J. H. Price, general manager of the Pittsburgh district of the American Steel & Wire Company, has resigned his position, to take effect December 1. Mr. Price will become assistant to President John H. Jones of the Pittsburgh & Buffalo Company of Pittsburgh, who are large producers of coal.

Labor Notes.

Samuel J. Parks of New York, the walking delegate of the Housesmiths' and Bridgemen's Union, recently convicted of extorting $500 from the Tiffany studios, the money being paid to call off a strike, was sentenced on November 6 to serve two years and three months in State's Prison at hard labor. This is the second time that Parks has been found guilty of extortion. The first time was when he was convicted of having extorted $200 from Josephus Plenty, a Hoboken contractor. Parks was sentenced to serve not less than two and one-half years, and not more than three and one-half years in prison, but got out of prison on a certificate of reasonable doubt secured by his counsel.

All negotiations between President Buchanan of the International Association of Bridge and Structural Iron Workers and his joint committee of iron workers and the Iron League over the recognition of Local No. 2 were called off on November 6. The suspension by the order of a national strike against the Iron League, pending peace negotiations, was taken off, and the national strike is now assumed to be in force. The final hitch came over the acceptance of the new Housesmiths' Union of New York by Local No. 2. The employers wanted Local No. 2 to take in this organization as a whole. The workmen's committee agreed to accept all the members of Local No. 2 who had gone over to the new union without imposing a penalty, to take in all other members who were satisfactory, after an examination, and to take in the rest as apprentices, but the employers would not yield this point. The contest, of course, centers in New York.

Notices have been posted at the offices of the Susquehanna Iron & Steel Company, at Columbia, Pa., that beginning on November 23 wages of puddlers will be reduced from $4.50 to $4 and those of other workers in proportion.

A Southbridge Labor Contest.

The American Optical Company of Southbridge, Mass., acting with smaller concerns of the town, have taken vigorous steps to nullify the influence of the union in their works. Last week employees of the Snell Mfg. Company of the neighboring village of Fiskdale demanded the reinstatement of an officer of the union discharged for nonfulfillment of his duties. The answer given by the company was that no employee would be retained in the shops unless he agreed to renounce the union. When the shop started up Monday morning all but a few of the men had signed such an agreement.

In Southbridge a branch of the Metal Platers', Buffers', Polishers', Brass Molders' and Brass Finishers' Independent Union of North America was established two months ago. The American Optical Company, acting with the Hyde Mfg. Company and Dupaul Young Optical Company, manufacturers of optical goods, and the Harrington Cutlery Company and Theodore Harrington, cutlery manufacturers, decided to put an end to unionism in their works, and followed the method which Smith & Wesson of Springfield, Mass., used to such good effect last summer. Monday afternoon, the 9th inst., copies of the following notice were posted in each of these shops: "This factory will be closed to-night and remain closed until further notice, for purpose of reorganization. Wages will be paid in full at the factory on demand. Any of our employees who are desirous of work upon reopening of the factory and who wish for information will communicate with the superintendent or their foremen."

Each employee was given a card containing the following blank agreement, with the understanding that it must be signed before he could resume work:

"I hereby affirm that I am a member of no labor union whatsoever, and agree that I will not join such union while in the employ of said company without giving it a week's notice, in writing, of my intention of doing so."

The shops started up again Tuesday morning, the 10th inst., and of the nearly 1900 men employed all but 325 immediately signed the agreement. Most of those who have not signed are polishers or grinders. All but 260 of the 1700 employees of the big American Optical Company went back to work. The companies will not act precipitately in the matter of those who have not signed. The men will be given ample time to consider the matter before their places are filled. In the meantime all departments in every shop are running.

PERSONAL.

C. H. Cady, general manager of the mines of Witherbee, Sherman & Co., Mineville, N. Y., will spend some time in Florida to recuperate. During his absence C. Norton of Troy will act.

Bryan Robertson of Pittsburgh has been placed in charge of the Field-Evans Iron Company's Pittsburgh office, 801-2 Murtland Building. The company have taken over the furnace agencies heretofore handled by J. K. Dimmick & Co.

Irving H. Reynolds will shortly retire from the Allis-Chalmers Company of Chicago, Ill., and the duties of chief engineer will be assumed by the engineers in charge of the various departments, these engineers availing themselves of the advice of Edwin Reynolds, consulting engineer of the company.

John W. Gates, accompanied by his son, Charles G. Gates, is cruising down the Illinois and Mississippi rivers in Mr. Gates' 17-knot twin-screw steam yacht, "Roxana." The start was made at La Salle, Ill., November 7, and the point of destination is Port Arthur, Texas, where Mr. Gates has his winter home.

D. R. Mathias, who for years has been assistant superintendent of the Illinois Steel Company's plant at South Chicago, has been made general superintendent of the Joliet works of that company to succeed Mr. Sheldon, who goes to the Lackawanna Steel Company on November 15. Mr. Mathias' successor at South Chicago has not yet been chosen.

Veryl Preston, third vice-president of the United States Steel Corporation, has resigned. Mr. Preston had been connected with the corporation since their organization.

Allen Greenwell, editor and manager of the *Colliery Guardian*, London, will shortly arrive in this country for the purpose of visiting the leading coal producing regions. He has in view the visitation of all the great coal producing centers of the world.

Dr. Hans Goldschmidt of Essen, Germany, will, on Friday evening, deliver a lecture in Havemeyer Hall, Columbia University, on "Alumino-Thermics, or the Production of High Temperatures by Burning Aluminum, and the Application to Metallurgy and Engineering."

Reeves & Co. of Columbus, Ind., have adopted a new plan to avoid strikes. The company are now invoicing and before starting up again each employee will be asked to sign an individual contract with the company, stating that he will work for a certain period at a certain amount of pay. This is done as a precaution against strikes after the prices are set for the coming year and orders taken based on those prices. In the past the company have suffered heavy losses by strikes at inopportune times.

While the consolidation, recently referred to in these columns, of the Whitaker Iron Company and the Wheeling Corrugating Company of Wheeling, W. Va.; the Laughlin Nail Company of Martins Ferry, Ohio, and the Portsmouth Steel Company of Portsmouth, Ohio, has been about consummated, the final organization has not yet been effected. We are informed, however, that the details will be completed next week, at which time official announcement of the consolidation will be made. The name of the new company will be the Whitaker-Glessner Company, and headquarters will be established at Wheeling, W. Va.

HARDWARE.

ONE of the serious problems which confront the business man of to-day is the relation of organized labor to commercial affairs, which has so direct a relation to the Hardware and allied trades, who have so much to do with building, which perhaps more than any other is the chosen field for the assertion of the union's authority. Where a building strike is on there is, however, not only a stoppage of business in the materials which would enter into the structure and the disuse of the tools of the mechanics, but factories perhaps distant from the scene feel its effect in the diminished call for their products. At the same time an uneasy feeling is engendered and capital becomes timid. In this way business suffers in many directions and a damper is put on projected enterprises. Meanwhile the manufacturer has his own troubles, and in many cases is in apprehension of a breaking out of difficulties among his employees.

This question has been with us for many years, and no satisfactory solution of the problem has yet been found. While some departments of labor are working smoothly without unreasonable stress or dictation, in others there is still restlessness and a disposition to dictation which is injurious to all parties concerned. It is generally recognized as idle to talk of doing away with this principle and movement since it is proper for the laboring classes to do what they legitimately can for their own protection and advancement. In view, however, of the tendency of labor to go to unreasonable extremes it is a fact full of promise that there is so general a disposition on the part of manufacturers to come together and to act together in this matter. Whether or not formal action will be taken by the Hardware manufacturers who meet next week in Atlantic City, there is little doubt that this will be one of the subjects which will be discussed in the lobbies as well as at the sessions of the association. So representative a body of manufacturers, including as it does many broadminded and able men, mindful of their interests and those of the country at large, should be able to make some contribution to the settlement of this troublesome and difficult question.

It is well also to recall that it is an "ill wind that blows nobody good," and that if prosperity is waning some compensation will be found in the check which thus naturally, one might almost say automatically, will be applied to the unreasonable domination of labor. The leaders of organized labor seem to be blind to the fact that they have done much to check prosperity and to bring about a condition wherein they will be the greatest sufferers. If new ventures are no longer afield because promoters will not take the chance of labor strikes and difficulties, the inevitable result will be the falling off in employment and the increasing number of idle men. When it comes to this point unions are practically helpless, since no sort of allegiance will hold men who are without work and without bread, and no accumulation of strike funds will survive a season of hard times, especially when manufacturers are banded together and will close their works rather than submit to the dictation of the "walking delegate" and the labor boss. In the consideration of all the phases of this broad and complicated subject there is abundant opportunity for those who gather at Atlantic City to use their best wisdom and take hold in a practical way of a problem in which united action is essential to success.

The wide and permanent influence which should result from the attention which is being given to the subject of factory costs and the closely related matter of factory management is referred to by a prominent Western manufacturer in a letter touching on the articles on these subjects which are now appearing in our columns. The point he makes is that the perusal of such articles is arousing manufacturers to the importance of the subject and stimulating them to go into the matter more thoroughly than most of them have done. When they once enter on the quest for good business methods our correspondent says that they will continue to improve their methods, and "as a result there will be a class of manufacturers in this country within a few years who will outstrip the record of those whom they succeed, and it is by just such intelligence that we as a country will be able to win in the race against every other country." The painstaking care which devises and puts into operation good cost systems is thus regarded as contributing not only to the individual prosperity but to that of the country at large.

Condition of Trade.

The trade situation is such as to command the most careful consideration of manufacturers and the larger merchants in order to determine the policy to be pursued in making their plans for the future. It is obviously the part of wisdom for jobbers and manufacturers generally to act with caution in the purchase of goods, and most of them are endeavoring to get rid of any unnecessarily large stocks, keeping on hand a sufficient supply for current trade. Their purchases are accordingly quite limited, and reflect their desire to end the year with as few goods as possible in their warehouses. The manufacturers naturally recognize the same features in the business situation, but find it necessary to make their plans further in advance. In view of the declines which are taking place in the raw material and the uncertainties which attend the future course of business, they are proceeding cautiously and not contracting ahead to the extent which has been usual for several years past. Many of them are beginning to clear their books, which have been encumbered with orders for a long time, and are showing an increased desire to effect sales. Slight concessions in price are thus becoming more common. The market, however, holds remarkably steady. This is, indeed, what would naturally be expected, especially in Shelf and the finer goods, as the diminished cost of material has in many classes of articles little effect on their total cost, labor, which remains unchanged, being a much more important element. While there is thus in the situation enough of weakness and uncertainty to make the ordinary Hardware merchant conservative in buying, there is nothing to justify a policy which would neglect the stock and permit it to run down below a good working level. More would be lost in sales and in the tone and prestige of his business than would be gained by the avoidance of shrinkage in the value of the stock on hand. Fortunately, the popular demand continues good, and the prosperity of the people will, it is hoped, prevent too serious an interruption of the demand which has made business so satisfactory for some time. The fact of declining prices is to be faced in a sensible manner, recognizing the desirability of having values on a more reasonable and permanent basis. When this is reached, it is to be anticipated that the demand will again improve and both domestic and foreign trade resume their former activity. In this connection the following advices from one of the most prominent manufacturers will be of interest:

We look for a large demand for our products for the

opening months of 1904. The recent slight depression in some sections, due in part to the changing pulse of the stock market, and also the reduction in number of hands employed by some of the railroads and manufacturing companies, will put an effectual stop to the mania for strikes, which have been prevalent all over the country. When people desire to work, there will be plenty of work to do, especially in the building and material lines; for these reasons we confidently look for a large business for the coming year.

Chicago.

The Hardware situation in Chicago continues to be a favorable one. Shelf Hardware is moving satisfactorily, and the leading jobbers and retailers state that their October business has been fully up to any previous year, in some instances showing 10 to 15 per cent. advance over previous years. Inquiries for Builders' Hardware are coming in more rapidly than at any time for the last six months, and indications look to an awakening in building circles early next year as soon as outdoor operations can commence. This revival of building operations is ascribed to the lower prices of brick and some other materials, and particularly to the noncombative spirit that has come over the trade unions. The sad lesson learned by investors in industrials and other securities is leading them to turn again to real estate and building. Stoves are not in extremely active demand, owing to the fact that the coal famine of last year necessitated the carrying over of a large number of Stoves by the local Hardwaremen, and until this stock is gone manufacturers do not look for a very active sale. Cut Nails begin to show a little more life under the impetus of the 25-cent reduction in prices. This is a product in which the cheapest grade finds the readiest sale, and the supremacy of the Wire Nail for the last year or two has been largely due to the fact that it has sold at a lower price than the Cut Nail. The small reduction in the price of Wire Nails is not sufficient to overcome the advantage that the Cut Nail will enjoy for prompt shipment. The feature of the Nail business is the extreme demand and apparently small supply of eight and ten penny sizes. This demand is ascribed largely to the fact that thousands of corn cribs are being put up by farmers of the West to store their bumper crop. The big corn crop has also led to an exceptional demand for Corn Huskers and Corn Husking Pins, one large wholesaler saying that his sales for the months of September and October in these little specialties has exceeded the total sale for any two years, or, in other words, for the previous 24 months. Carriage Bolts have been quite active; Stove Bolts less so, because of the number of Stoves carried over from last year, on account of the coal famine; Tire Bolts are a little slow in demand, owing to the fact that the wet weather of the last two years has held together vehicles that ordinarily would have rattled to pieces. The demand for Wood Screws is fairly active, as the various wood working industries are running full time. Wire products continue active and prices firm, in spite of the fall in pig and billet prices, which has proved so disastrous to activity in other finished steel products.

NOTES ON PRICES.

Wire Nails.—A moderate but steady demand characterizes the market, confined largely to carloads and small lots, indicating that the trade are buying only for immediate requirements. The market is well maintained, but delivered prices from some mills do not alway represent full tariff rates. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carload lots	$2.00
Retailers, carload lots	2.05
Retailers, less than carload lots	2.15

While no change in prices has been announced, it is understood that slight irregularities are somewhat more general than they have been.

New York.—The character of orders received shows that stocks in retailers' hands are only sufficient for immediate requirements. The demand is for small lots from store, with request for prompt shipment. Quotations are as follows: Single carloads, $2.20; small lots from store, $2.25 to $2.30.

Chicago, by Telegraph.—The leading producer strenuously denies that a cut of $1 per ton has been made in Wire Nails, and insists that the price remains at $2.15 to $2.20, Chicago, in carload lots, the latter price being the one made to retailers. Business is unusually active, it is claimed, and the outlook bright.

Pittsburgh.—While no open reduction in price of Wire Nails has been made, it is understood that the leading mills are making slight concessions with more freedom than heretofore. The trade are buying very cautiously, generally anticipating lower prices, and as a result orders are mostly of a hand to mouth character.

Cut Nails.—The reduction which went into effect on November 1 has appeared to stimulate demand at the mills to some extent. The action taken by the Cut Nail Association in lowering the price is favorably regarded by the trade. Quotations are as follows: $1.90, base, in carloads, and $1.95 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms, 60 days, less 2 per cent. off in 10 days.

New York.—The reduction in price, which went into effect November 1, has resulted in an increase in the number and size of orders. Quotations are as follows: Carloads on dock $2.04½; less than carloads on dock, $2.12½; small lots from store, $2.20.

Chicago, by Telegraph.—As a consequence of a reduction of prices of Cut Nails, business is considerably more active. The prices to jobbers here are $2.06½ in carload lots and $2.11½ in less than carload lots, and they retail from store at $2.25.

Pittsburgh.—Demand for Cut Nails is somewhat quiet, being mostly for small lots, but we are advised that the price of $1.90 base in carloads is being held. The action of the Cut Nail Manufacturers' Association in making such a heavy cut in prices is being generally commended, and is regarded as a step in the right direction, in view of the general conditions surrounding the Steel trade. We quote: Steel Cut Nails, $1.90, base, in carloads and $1.95 in less than carloads; Iron Cut Nails, $2, base, in carloads and $2.05 in less than carloads, plus freight in Tube Rate Book to point of destination, 60 days, less 2 per cent. off in 10 days.

Barb Wire.—The tonnage being shipped from the mills is fair. Orders are frequent, and for small quantities, rather than the placing of contracts. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots	$2.30	$2.60
Retailers, carload lots	2.35	2.65
Retailers, less than carload lots	2.45	2.75

There are rumors of concessions in price, but quotations remain without change.

Chicago, by Telegraph.—No changes in the condition of business or prices are discoverable, and the leading producer insists that no change in prices is likely to be made in the next six months, as the demand is fully up to the facilities for supplying it. Galvanized Wire is selling on the basis of $2.75 to $2.80 in carload lots, and Painted at $2.45 to $2.50, the outside price being to retailers. For small lots 5 to 10 cents extra is charged. Staples in carload lots sell as follows: Plain, $2.30 to $2.35, and Galvanized, $2.70 to $2.75, the outside price being to retailers.

Pittsburgh.—Demand is very light and is mostly for small lots. Slight concessions in prices, about $1 a ton, are obtainable, and we have slightly revised our quotations. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days: Painted, $2.25 to $2.30; Galvanized, $2.55 to $2.60, in carloads to jobbers: Painted, $2.30 to $2.35; Galvanized, $2.60 to $2.65, in carloads to retailers; Painted, $2.40 to $2.45; Galvanized, $2.70 to $2.75, in small lots to retailers.

Smooth Fence Wire.—The mills are actively employed filling orders, which keeps them running to nearly full capacity. Slight inequalities in price are reported. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads..................................$1.90
Retailers, carloads.................................. 1.95
Less than carloads.................................. 2.05

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12&12½	13	14	15	16
Annealed.....	Base.	$0.05	.10	.15	.25	.35	.45	.55
Galvanized...	$0.30	.35	.40	.45	.55	.65	1.05	1.15

Chicago, by Telegraph.—The outlook in this material is bright and present business is all that could be expected. The leading factor claims that there is no difficulty in making sales at current prices, which are as follows: Nos. 6 to 9, $2.05 to $2.10 in carload lots on track, and $2.15 to $2.20 in less than carload lots from store; Galvanized, 30 cents extra for Nos. 6 to 14, and 60 cents extra for Nos. 15 and 16.

Pittsburgh.—Demand is very heavy and the leading mills making Fence Wire are quite busy. Prices are fairly firm, but a concession of about $1 a ton is being made. Open quotations remain as before.

Shovels and Spades.—During the week several of the manufacturers of Shovels and Spades have made announcement of their prices, which are substantially the same as those which have been current for some time. While some of the manufacturers are shading slightly some of the former quotations, there has been no general or open reduction. Prices, in fact, were put on so low a basis by the association, with a view to making difficult the competition of outside manufacturers, that there is little room for the development of lower quotations on the goods most largely sold. The leading interest is in a general way adhering to the policy of the association, and, representing as they do about 75 per cent. of the output, the dissolution of the association has had as yet comparatively little effect upon the general situation. It is expected that they will continue the policy of the association, and endeavor to make it to the interest of the trade to confine their dealings to their factories. Some of the manufacturers who have been in the association now practically become outsiders, and in this way the competition will naturally be somewhat intensified. Some of the other outside makers are also in a position to produce goods advantageously. Since the establishment of existing prices a number of manufacturers have withdrawn from the market, and it is not unlikely that others will follow.

Sheet Zinc.—Under date of November 9 Matthiessen & Hegeler Zinc Company, La Salle, Ill., issue a circular announcing $6.50 as the price of Sheet Zinc in 600-pound casks, subject to the usual discounts in quantities.

Wagon and Carriage Springs.—The market for Carriage and Wagon Springs is referred to by the manufacturers as in a fairly satisfactory condition, with about a normal demand. There is some evidence of a disposition on the part of the trade to defer orders in view of the declining price of iron, thinking that perhaps this will affect Springs. Prices are, however, well maintained and the market is in a better condition, owing to the fact that some houses who some time ago were making exceptionally low prices deemed it advisable to withdraw them.

Blacksmiths' Vises.—The understanding which for some time has existed among the manufacturers of Blacksmiths' Vises has recently terminated, and the market on this line of goods is now an open one. As a result of this, and of the reduced cost of the raw materials lower prices are current.

Cordage.—Manufacturers express themselves as satisfied with the demand, which is good for the season. The market has a firm tone and quotations, on the basis of 7-16-inch diameter and larger, are as follows: Pure Manila, 11½ cents; second-grade Manila, about ½ cent per pound lower; Pure Sisal, 9¼ cents; Mixed Sisal, 8¼ cents per pound.

Seamless Brass Tubes.—Under date, November 2, a reduction in the price of Seamless Brass Tubes was made by the manufacturers, the base price being put at 18 cents per pound. The following are the prices thus established on the various sizes:

Seamless Brass Tubes.—Outside Diameter.—Stubs Wire Gauge Standard

Stubs W. G.	B. & S. W. G.	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/4	1 1/2	1 3/4
4 to 11	3 to 9	..	..	..	..	..	..	..	..	..	..	..	18	18	18
12	10	..	..	..	..	..	..	..	24	24	23	23	18	18	18
13	11	..	..	..	..	..	..	..	25	25	23	23	18	18	18
14	12	..	..	..	..	..	25	25	25	23	23	23	19	19	19
15	13	..	..	..	..	26	25	25	25	23	23	23	19	19	19
16	14	..	..	..	26	26	25	25	25	23	23	23	20	20	20
17	15	..	..	29	26	26	25	25	25	23	23	23	21	21	21
18	16	..	49	31	27	27	26	26	26	24	24	24	22	22	22
19	17	82	58	31	27	27	26	26	26	24	24	24	23	23	23
20	18-19	87	60	31	27	27	26	26	26	24	24	24	24	24	24
21	20	92	62	47	29	28	28	28	25	25	25	25	25	25	25
22	21	97	67	52	31	31	29	29	27	26	26	26	26	26	26
23	22	1.02	72	57	33	33	31	31	29	29	29	29	29	29	29
24	23	1.12	77	62	49	44	42	41	40	39	37	36	36	37	37
25	24	1.27	82	67	52	47	45	43	42	41	40	40	41	42	..

Stubs W. G.	B. & S. W. G.	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	4 1/4	4 1/2	4 3/4	5	5 1/4	5 1/2	5 3/4	6	6 1/4	6 1/2	6 3/4	7	7 1/4	7 1/2	7 3/4	8
4 to 11	3 to 9	18	18	18	18	18	18	18	19	19	19	21	21	23	23	24	24	25	25	25	25	25	27	27	27	29
12	10	18	18	18	18	18	18	18	20	20	20	22	22	24	24	25	25	26	26	26	26	26	28	28	28	30
13	11	18	18	18	18	18	18	18	21	21	21	23	23	25	25	26	26	27	27	27	27	27	29	29	29	31
14	12	19	19	19	19	19	19	19	22	22	22	24	24	26	26	27	27	28	28	28	28	28	30	30	30	32
15	13	19	19	19	19	19	19	19	24	24	24	25	25	27	27	29	29	32	32	32	34	34	37	37	37	..
16	14	20	20	20	20	20	20	23	24	25	26	29	29	29	34	34	34	37	37	41	41	41	44	44	44	..
17	15	21	21	21	21	21	23	24	25	26	27	30	30	30	35	35	35	38	38	42	42	42	45	45	45	..
18	16	22	22	22	22	24	25	26	27	28	29	32	32	32	38	38	38	41	41	48	48	48	..	..	..	..
19	17	23	23	23	25	26	27	28	29	31	33	35	39	39	43	47	49	49	..	..	..	..	..	..	..	..
20	18-19	24	24	25	25	26	27	29	29	31	37	37	41	41	49	49	..	..	..	..	..	..	..	..	..	..
21	20	25	25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
22	21	26	26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
23	22	31	33	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
24	23	38	39	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
25	24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

NOTE.—For diameters of the fractional parts of an inch, where no price is given, take the column to the left of where such size would appear if designated, thus: 1 15-16 would go at price of 1¾ inches, 1⅛ at the price of 1 inch, 5⅛ inches at price of 5 inches.

Refrigerators.—While weather conditions for the past season were anything but favorable for the sale of Refrigerators, probably the aggregate sales of manufacturers were larger than during 1902, and there was also perhaps an increased demand for goods of the better class. Dealers were, however, conservative about placing mail or duplicate orders, and only bought on the hand to mouth basis. We are advised that this line of goods is getting into more general use, and a greater demand is noted, not only for the ordinary stock sizes, but for constructions built to order with fancy linings, and for sectional Coolers for market and display purposes. The outlook for 1904 is that business should prove certainly as good as for the past season. Merchants are inquiring earlier than usual for catalogues and prices, possibly in apprehension of an advance in view of labor agitation and increased cost of production. While the manufacturers do not declare their intention to advance quotations over those prevailing for the past season, the justification of such a course is emphasized, and an intimation is given that discounts will be more firmly maintained than was the case during 1903, if an actual advance is not determined upon. Reference is made to the fact that lumber has advanced in price, to say nothing of sheathing papers, certain kinds of metal and supplies in the Hardware line, as well as freights and general expenses, which would justify an advance in last year's prices, and would, some of the manufacturers think, be cheerfully paid by the trade. It remains to be seen, however, if the various makers will get together on this point. Stocks in the hands of merchants are not regarded as large, and in the experience of several makers have been pretty well cleaned up. Comparatively few changes or innovations are announced by the manufacturers.

Glass.—The report is confirmed that the skilled Glass workers have adopted a uniform scale of wages for all manufacturers and Glass workers for the fire of 1903 and 1904, the scale agreed upon being an advance of 2½ per cent. over the scale adopted about two months ago by manufacturers and the Wage Committee of the Window Glass Workers' Association of America. For the purpose of cutting off imports, the workers agreed to allow manufacturers to make 30 100-foot boxes, equivalent to 60 50-foot boxes, per single strength blower, in the first three brackets, in each settlement, at a reduction of 25 per cent. in wages. This quantity of Glass will amount to a small proportion of the yearly Glass importations. The agreement is regarded by some in the trade as an entering wedge for securing more Glass at the same reduction, should manufacturers be offered orders which they could accept at the reduced cost of making. It is expected that higher prices will now be made for domestic trade, and that manufacturers will agree not to sell below a certain figure, this being, possibly, the cost of manufacture. There are generally some manufacturers who are in pressing need of money, and under these conditions may sell below established prices. There never was a time when the country was so bare of stocks nor jobbers so conservative in replenishing. In the local market jobbers appear to have no regular prices, but to make quotations which will secure what little business is offered.

Oils.—*Linseed Oil.*—The unsettled condition of the seed market is affecting the demand for Oil to some extent. This is restricted, as for some time, to sales for immediate delivery. The tone of the market is easy, without quotable change in price. Quotations are as follows: City Raw, in lots of 5 barrels or more, 37 cents; in lots of less than 5 barrels, 38 cents per gallon. Out of town and Western Oil is quoted at 38 cents per gallon.

Spirits Turpentine.—The demand at this point is light at the following quotations, according to quantity: Oil barrels, 59½ to 60 cents; machine barrels, 60 to 60½ cents per gallon. Shipments from Savannah are now being made without much difficulty, as the striking freight handlers have been replaced.

A RATHER unusual condition of things, so far as the sale of Nails is concerned, is reported by a correspondent in New England—namely, that retailers have been selling this line—especially Cut Nails—cheaper than the jobbers, many of whom are bound by an agreement among themselves. The larger retail merchants are said to buy direct from the manufacturers, and thus secure advantageous quotations. Strange as it may seem, we are assured that in several instances where dealers do both jobbing and retail business, they have been selling Nails at lower prices as retailers than as jobbers.

PIKE MFG. COMPANY'S EIGHTIETH ANNIVERSARY.

CONGRATULATIONS are in order for the Pike Mfg. Company of Pike Station, N. H., who are now celebrating their eightieth anniversary. Nearly all dealers and users of Sharpening Stones are more or less familiar with the name of Pike. In 1823 only a few Scythe Stones of one brand were being sent out; since that time the business has steadily grown and developed, until to-day not only large quantities of Scythe Stones of different qualities and grades but also Sharpening Stones of many other kinds are being shipped to far away portions of the globe. Much of this large increase in the volume of business done is due to the untiring energy of the president of the company, E. B. Pike, seconded by his son, E. Bertram Pike, treasurer. Aside from the Stones of their own manufacture, the names of which are familiar to the trade, such as the Black Diamond, White Mountain and Indian Pond Scythe Stones, the Lily White Washita and Arkansas Oil Stones, the company have the sole agency for the India Oil Stones, manufactured by the Norton Emery Wheel Company. They are also the agents in this country for the celebrated Swaty Hones, Craigleith and Blue Miter Wheels, and handle nearly everything in the line of Sharpening Stones. In rounding out four score of years the company will have the heartiest congratulations of the trade and also their best wishes for continued growth and prosperity in the future.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS *for catalogues, price-lists, quotations, &c., have been received from the following houses:*

FROM RUSH, GARDNER & BARTLETT COMPANY, Marlin, Texas, who have lately opened a branch store at Maypearl. They will be pleased to have manufacturers send copies of price-lists, catalogues, &c., to the new house.

FROM A. WM. ZIMMERMAN, who has recently commenced business at 1714 Greenmount avenue, Baltimore, Md. Mr. Zimmerman's line embraces General Hardware, Paints and Oils, Glass and House Furnishing Goods.

FROM GEO. THORNTON, Victor, N. Y., who is about to open a Hardware store in that place.

FROM BENJAMIN D. BROWN, who is intending soon to embark in the General Hardware business at Tottenville, N. Y.

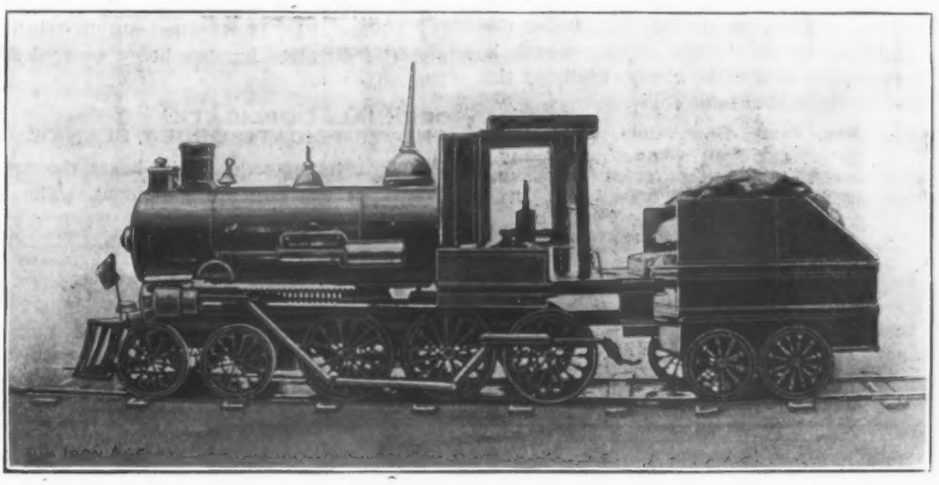
FROM M. D. HADDOX, who has lately bought the Hardware, Stove, Tinware, Paint, Sporting Goods and Furniture business of M. E. Ferry, Brock, Neb.

PHILADELPHIA LAWN MOWER COMPANY'S CATALOGUE.

THE PHILADELPHIA LAWN MOWER COMPANY, 3101-3109 Chestnut street, Philadelphia, Pa., issue their thirty-fifth annual catalogue and price-list for 1904 of the genuine Philadelphia Lawn Mowers. This is a handsome production, many of the illustrations being in colors, showing Hand Lawn Mowers in a variety of styles and sizes, Horse Mowers, Grass Collecters, Horse Sweepers, Lawn Sprinklers, &c.

A HARDWARE LOCOMOTIVE.

FOR display in one of their show windows, Landon & Co., 2136 Third avenue, New York, arranged a locomotive made of Hardware and kindred articles from their stock. It measured 44 inches in length over all and 14 inches in hight to the top of the cab. It stood on a track 4 feet long, made of Brass Sliding Door Rail, with Emery Oil Stones for ties. The wheels were 4 and 5 inch Ventilator Plates on axles of Wood Dowels. The boiler jacket was made of 5-inch Stove Pipe. The cab was formed of two Cash Boxes, the open covers forming the roof and the floor. The tender was made up of a Cash Box for the base and Plasterers' Miter Rods for the sides. The pilot, or cow catcher, was made of tin. All tin and sheet iron portions were finished in black enamel. The cylinder was a Speaking Tube Whistle, while the steam chest above was a Butt Gauge. The rod to the drivers was a Jointed Steel Rule, the piston rod to the cylinder a Brass Curtain Rod, and the pipe to the steam chest an arm from a Drop Light. The running board was a Steel Rule, the whistle and sand box were Oil Cans, and the bell part of a Shutter Knob. The smoke stack was of sheet iron with a Brass Speaking Tube Mouthpiece for the top. The head light was of tin, containing a 4-candlepower electric light. The different parts of the locomotive were well represented by the articles used in construction, the whole making a fine appearance. Credit for the idea and its execution are due to Charles Henne and William Van Winkle, clerks in the employ of the firm, who put the locomotive together in four days, utilizing the time at their disposal which could be spared in waiting on customers.



A Hardware Locomotive.

NEXT WEEK'S CONVENTIONS AT ATLANTIC CITY.

THE formal programmes for the conventions at Atlantic City next week of the National Hardware Association and the American Hardware Manufacturers' Association are now ready. Both conventions will begin their deliberations on Wednesday, 18th inst., the closing sessions being held on Friday, 20th inst. We have already mentioned the special features of the programmes, which are full of promise for educating and businesslike conventions. A large attendance is looked for, and the Rudolf, where the conventions will be held, is pretty well booked up, a number of visitors being also booked at the St. Charles and Haddon Hall. It is expected that the manufacturers' association will have about 250 representatives, with probably 60 ladies, and that the jobbers will foot up about 125 delegates, with 75 ladies. In addition there will doubtless be a number of manufacturers present not now affiliated with the association, besides the representatives of the press and others. The outlook is thus gratifying for a large and thoroughly representative gathering.

HARDWARE STORE WINDOW DISPLAY.

BY C. V. FERGUSON.

I AM the fortunate possessor of an old fashioned large spinning wheel of my grandmother's time, together with the cards, swifts and reel. I recently made a display of these things in my window, and beside the old spinning wheel I placed a modern 1901 Bicycle. I was surprised to see the number of people who had never seen one of these old Wheels, and who came in to question me concerning it. The conversation was easily turned to Bicycles or Carriages, and I would thus get the name of a prospective buyer for one or the other of these vehicles and be enabled to keep after his trade.

Poultry Netting.

To advertise Poultry Netting during the week preceding Easter I had my window fenced with a 4-foot netting and have had a hen with a brood of 17 chickens inside. This was not only appropriate to the season, but from the fact of its being a particularly early brood for this section, brought many customers and much praise for the window display. I followed this up by placing a large *papier mache* egg 3 feet in hight in the inclosure, removing the chickens and advertising the results of feeding Pratt's Poultry Food, which I carry.

"Keep Them Guessing."

I find people are beginning to expect something new in my windows, and often ask, "What will you have next?" and I propose to "keep them guessing." It pays to advertise, and well directed efforts in window displays not only add to the attractiveness of your own store but to the appearance of the streets, and create a pleasing and lasting impression upon "the stranger within your gates."

LOUIS LOEWENSTEIN, active head of the firm of Loewenstein & Sons, wholesale Hardware merchants, Charleston, W. Va., died on the 28th ult. in the Jewish Hospital at Cincinnati, Ohio, where he had gone for special treatment and an operation. Mr. Loewenstein was born on August 3, 1868, and was thus in his thirty-fifth year. He was a member of the Charleston Chamber of Commerce and was a highly respected and honored citizen.

C. A. Morrison, Ellendale, N. D., has sold his Hardware business to Fountain & Paige.

Henry Katzeminger has just embarked in business at Hillsdale, Mich., handling General Hardware, Stoves and Tinware, Paints and Oils, Sporting Goods, &c.

J. E. Holmes has bought the Hardware, Stove and Tinware business formerly conducted by J. C. Agard in Canon City, Col.

FORECASTING MONTHLY COLLECTIONS.

THE successful Hardware manufacturer or dealer, especially the latter, must be able to size up with some degree of exactness his probable cash receipts, looking ahead for a month or longer, as the case may be. This is not always easy, unless there is something tangible in the way of figures upon which to base the approximation. Especially important is it that he know what he may depend upon in the way of collections. In the Hardware trade collections are not always as easy to make as in some other lines. It is necessary to figure closely in order that there may be no lack of available funds to meet current expenses and maturing obligations.

The Bigelow & Dowse Company, Boston, Mass., are using to excellent advantage a system of percentages based upon collections made in the past. A record is in hand of each month's collections, beginning with their business year, February 1, 1897. Taking the amount of money due the company from their customers at the end of each month, the percentage of the amount collected during the next month is carefully noted. For example, if at close of business September 30 there were bills receivable of $100,000, and during October $60,000 of the amount was collected, the percentage of that month is reckoned as 60, and noted in a table, always ready at the executive officers' hands, which is as follows:

	1897.	1898.	1899.	1900.	1901.	1902.	1903.
January ..	....	39	41.5	48	53.5	52.5	47.1
February .	48.5	40	48.5	46.2	47.2	45.8	42.6
March	63.9	61.2	59.2	55.4	53.4	56.5	51
April	74.3	65	57.3	57.1	58.6	63.1	50
May	58.8	57.7	61.3	54.2	58.3	51.5	46.7
June	50.6	50.2	53.3	57	51.8	47.9	52
July	50.4	47.1	47.9	46.6	49.3	45.7	45.5
August ...	44.6	45.6	46	47.5	50.5	49.1	....
September.	52.7	45.8	46.8	46.2	44.3	46	....
October ...	44.6	40.1	46.4	51.9	53.8	49	....
November..	44.6	38	46	51.9	51.1	46.4	....
December..	37.5	40.5	43	51.1	50.6	45.4	....

As will be seen from a scrutiny of the table there is a strong similarity in percentages of a given month during the series of years, and this similarity the Bigelow & Dowse Company have made good account of. Occasionally a month makes a sharp variation, but the average may be pretty nearly relied upon. Of course, in the company's table the figures in dollars and cents are also shown. The officers know what other conditions may be expected to enter into the next month's collections, and with previous percentages as the basis of reckoning they have succeeded in reckoning to within $1000 of what proved to be the actual result. With the certain knowledge of such fixed expenses as rent, insurance, pay roll, lighting, heat, &c., and knowing the almost exact income to be depended upon, it is an easy matter to determine the available funds which may be devoted to the purchase of stock, improvements, &c.

OTTO LINDEMANN of O. Lindemann & Co., manufacturers of Bird Cages, has bought the building 35-37 Wooster street, New York, the four upper stories of which are now occupied by his firm. The building is 50 x 100 feet, with splendid light, and many improvements have been made in it during the past three months.

FACTORY COST AND BUSINESS METHODS.

SELF-PROVING COST SYSTEM OF BRIDGEPORT BRASS COMPANY.

BY GUY P. MILLER.

The last article having described the course pursued in making an estimate for a prospective customer, the present article explains the system under which the order is executed and a record kept of the cost of material and labor.

Third Article.

ROUTINE IN CONNECTION WITH EXECUTION OF AN ORDER.

ON receipt of order from the customer the order blank Fig. 17, is filled out in triplicate, the price and the estimate number being secured from card file, Fig. 16.

ORIGINAL, DUPLICATE AND TRIPLICATE ORDER BLANKS.

The original order, only, bears the price, and is retained in the Order Department. The duplicate and triplicate are sent to the Finished Stores Department where the duplicate is held in the foreman's file, and the triplicate is given to the packer, who records thereon shipments as they are made from time to time. The foreman transcribes to the duplicate order the records of shipments, and if the order is not completed he reports shipments to the Order Department by means of a Partial Shipment Order, which is identical with his order form, Fig. 17, except marked "Partial Shipment." If the order is for an article which is not carried in stock, as in the case illustrated, the foreman, or his clerk,

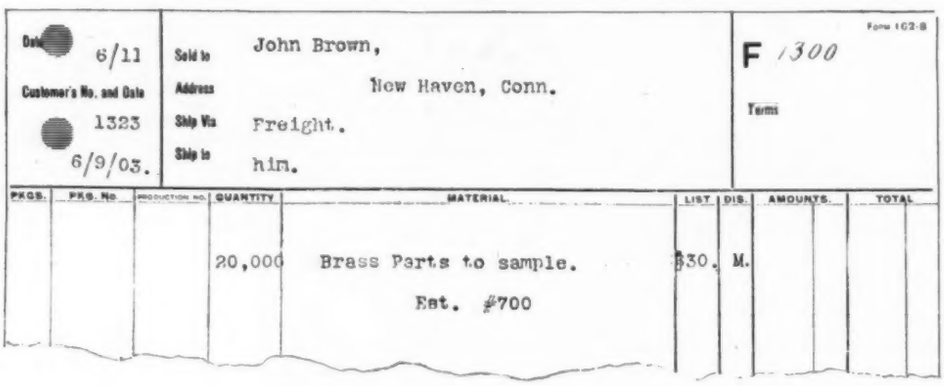


Fig. 17.—Manner in Which Order When Received is Entered. Size of Sheet, 5 by 8 Inches.

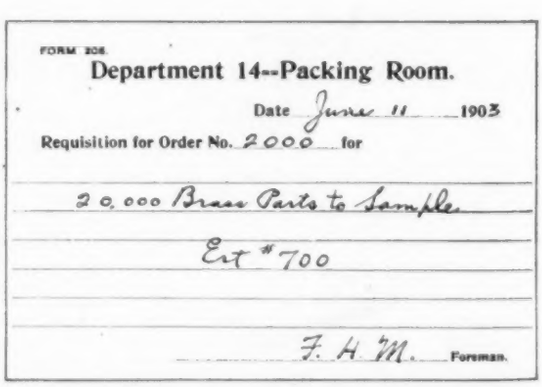


Fig. 18.—Requisition on Superintendent for Parts of Article Ordered. Size of Slip, 4 by 6 Inches.

makes out a requisition in duplicate on the Superintendent's office, Fig. 18, and keeps the duplicate in his file,

PRODUCTION ORDERS FOR DEPARTMENTS.

On receipt of the requisition, the superintendent's clerk takes the original estimate from the file, has it approved by the Superintendent, and makes out the orders for the various departments, the original being shown in Fig. 19, and the duplicate in Fig. 20. The ruling of the back of Duplicate Production Order, Fig. 20, is shown in Fig. 21, but that side of the card is used only for recording costs when the article consists of a single piece. The orders are made up in pads containing originals and duplicates, and pads of originals only. The originals are made of paper and duplicates of light cardboard. An order in duplicate is first made out, the original being sent to the department in which the goods will be completed and the duplicate held in the file in the Superintendent's office. As many originals are then made out by use of carbon paper as there are parts of the article, these being numbered 2000-A, 2000-B, &c. The number of each of these orders to be made out is determined by the number of departments through which the work has to pass, one copy of each being sent to each of the departments concerned. This gives each foreman an opportunity to plan his work to the best advantage, as he receives the orders for work which will be performed in his department considerably in advance of the time for his work on these to begin and before operations have been performed in any departments.

Form 104 Production Order No. 2000-A | To Department No. 33 | Date of Order June 10 1903

Please execute the following order, returning the order on completion of the work to the superintendent. Charge all labor and material to the above production order number. | In case you find it impossible to produce this order at prices noted below, report to superintendent before commencing the work.

Kind of Metal	Lbs. Ordered	Width	Gauge	Length	Temper	Remarks
H. B.	2100	3/32"	.135		Hard.	

Date Rec'd	Pounds	Quantity		Operations	Price Per M.
June 12	2100				
		20M	Brass Plates Est. #700	Punch & Form	.08
			John Brown		

SCRAP

Date Ret'd	Pounds
June 20	500

Excess Metal

To be completed by date as below June 20-03 | Date Completed June 20-03 | Approved B. S. S. Supt.

Fig. 19.—Original Production Order Issued by Superintendent. Size of Sheet, 5 by 8 Inches.

RECEIPTS FOR DELIVERIES, TRANSFER SLIPS, ETC.

Receipts of material are posted in the department where the first operation occurs, receipts of all other departments being shown by the report, on the back of the orders, of deliveries of departments. For instance, the receipts of Department 36 are determined by the deliveries of Department 33. Goods delivered by one department to another are accompanied by a transfer slip, Fig. 22, which enables each department to check its receipts as to pounds and pieces. Each foreman checks the operations and the piece work prices on the order, Fig. 19, with his original estimate, Fig. 12, and makes out piece rate cards in duplicate, Fig. 23. If for any reason it is impossible to perform the operation at the cost estimated, as on account of the machine being engaged on other work, making it necessary to have the operation per-

Form 104-1. Production Order. No. 2000-A | To Department No. 33-36-38-29-14. | Date of Order June 10 1903

Please execute the following order returning the order on completion of the work to the superintendent. Charge all labor and material to the above production order number. | In case you find it impossible to produce this order at prices noted below, report to superintendent before commencing the work.

Kind of Metal	Lbs. Ordered	Width	Gauge	Length	Temper	Remarks
H.B.	2100	3/32"	.135		Hard.	

Date Rec'd	Pounds	Quantity		Operations	Price Per M.
June 12	2100				
		20M	Brass Plates Est. #700	Punch & Form	.08
			John Brown		

SCRAP

Date Ret'd	Pounds
June 20	500

Excess Metal

To be completed by date as below June 20-03 | Date Completed June 20-03 | Approved B. S. S. Supt.

Fig. 20.—Duplicate Production Order Issued by Superintendent, Showing Departments through Which it Passes. Size of Card, 5 by 8 Inches.

formed on a slower machine, the piece rate price may not be the same as originally estimated. The piece rate established to "Pierce and Part" brass plate, Fig. 23, is 0.09 per 1000, whereas it was estimated, Fig. 12, to perform this operation for 0.08 per 1000. The original and duplicate piece rate cards are sent to the superintendent for approval. The original is then forwarded to the Paymaster's Department, and the duplicate returned to the foreman, after it has been posted by the estimating clerk

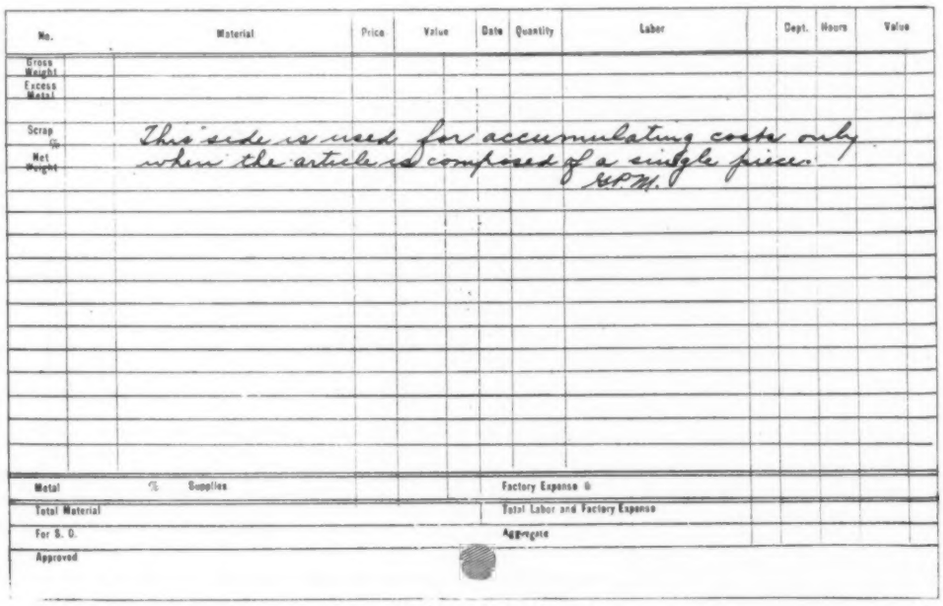


Fig. 21.—Back of Duplicate Production Order Which is Used for Accumulating Costs When the Article Consists of a Single Piece.

to the register of manufactured articles, a description of which will follow.

FOREMAN'S PRODUCTION ORDER RECORD.

The foreman of each department keeps a record of each order, Fig. 24, which remains in his department for reference at all times. This is filed with the order, Fig. 19, until completed, and shows at all times the number of parts which have passed through each operation in the department. Postings are made by the foreman or his clerk from the labor cards to the record card and from

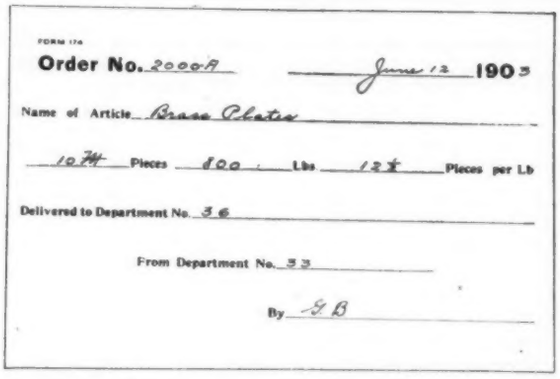


Fig. 22.—Transfer Slip, Showing Deliveries by One Department to Another. Size of Slip, 4 by 6 Inches.

the record card, Fig. 25, to the back of the production order, Fig. 26, of the deliveries of the department, and the final operation performed. After the completion of the order the record card is filed numerically by register number.

The next article will continue the description of the Cost System of the company, illustrating Register of Manufactured Articles and giving further information in regard to other methods used in ascertaining and recording costs.

AMONG THE HARDWARE TRADE.

Munger & Griffith, Hardware, Stoves, Tinware, Paints and Oils, Plumbing, &c., Pasadena, Cal., have changed their style to Crown Hardware Company.

Marshall & Belcher, Hardware merchants, Pocatello, Idaho, have dissolved partnership, and have been succeeded by Marshall-Belcher Hardware Company, Limited, who have been organized with an authorized capital of $20,000. The officers of the new company are Norman Belcher, president and treasurer; Andrew T. Marshall, secretary; Chas. E. Stevens, William Belcher and J. H. Brady, directors. Mr. Stevens has for the past year con-

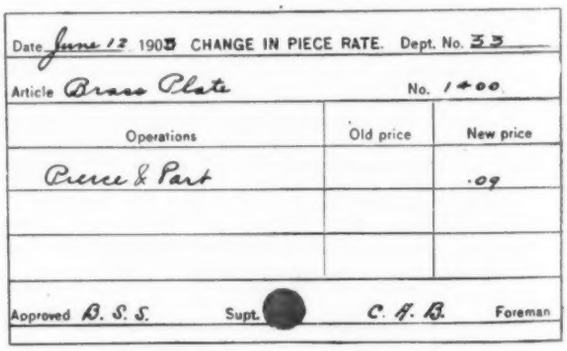


Fig. 23.—Piece Rate Card, Showing Price Paid for Operation. Size of Slip, 3 by 5 Inches.

ducted a plumbing and heating business in Pocatello, which has now been transferred to the new concern, this department being under Mr. Stevens' management.

The Edwards Hardware Company, Cordell, O. T., have disposed of their stock of Hardware to Frank Morrison, who will continue at the old stand.

S. Bradahl has disposed of his Hardware, Stove and Agricultural Implement business in Powhattan, Kan., to Graham, Joss & Co.

H. G. Markel is successor to Markel & Meredith in the Hardware, Stove, Tinware, Paint, Agricultural Implement and Sporting Goods business in Nebraska City, Neb.

A. S. Perry, Cuthbert, Ga., has been succeeded by Perry Hardware Company, who will continue the Stove,

Tinware, Shelf and Heavy Hardware, Agricultural Implement, Sporting Goods, Plumbing and Tinning business.

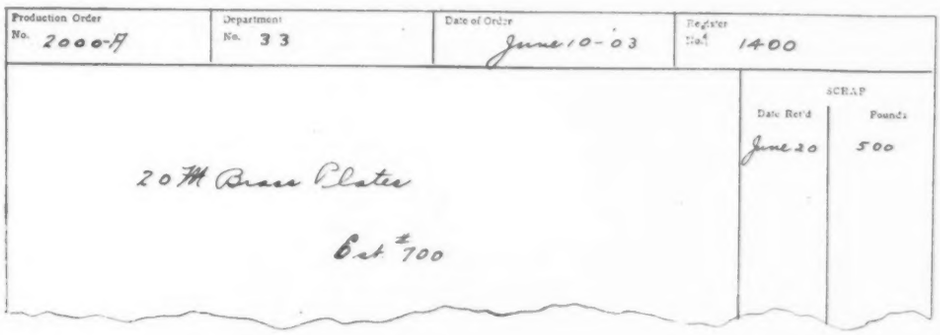
The Allott-Kryder Hardware Company, Alliance, Ohio, have been incorporated with a capital stock of $25,000, and the following officers: J. F. Kryder, president; J. F. Foltz, vice-president; Guy E. Allott, secretary-treasurer, and J. F. Kryder, manager. The company succeed Allott & Kryder, who have carried on the Hardware business at Alliance since March, 1901, when they bought out Wright & Pennock. The company includes a number of leading contractors and business men of the city, in addition to the former partners in the business. They will enlarge their stock and extend their business as circumstances warrant and several new lines will be taken up. The jobbing department will be somewhat enlarged to enable them to reach the large factory interests and contracting firms in their territory. The lines of goods handled embrace General Hardware, Paints, Oils, Glass, Roofing Materials, General Supplies, &c. The site occupied by the company's establishment has been used for the Hardware business since 1858.

Blakeman & Hahn have purchased the Hardware and Tinware business of G. E. Moore in Norfolk, Neb., and will take possession December 1.

The Schroeder Hardware business, at Blairsburg, Iowa, has been disposed of to C. M. Powers, who continues in the old quarters.

Some months since Taylor Hardware Company, Allegheny, Pa., moved into a new building at 1929 Beaver avenue, which was planned and erected under their supervision and is regarded as one of the most attractively and conveniently arranged stores in the State. This business was established in 1884, and was formerly located at 349 and 351 Beaver avenue. An extensive wholesale and retail trade is done in Builders' Hardware, Cutlery, Mill Supplies, House Furnishing Goods, Electrical Supplies, Bicycles, &c. The building consists of three stories and basement, each 20 x 90 feet. The basement is 8 feet high, with cement floor, and is used for Nails, Window Glass, Shovels, Machine and Carriage Bolts, Wheelbarrows, Grates, &c. The first floor is 14 feet high and is used for salesroom and offices. It has two large show windows, the bottoms of which are only 18 inches above the floor. Prism lights are used in front of the building, thus adding much to the brightness of the establishment. The shelving runs from floor to ceiling, and three rolling ladders are employed, two on the Hardware side and one on the House Furnishing Goods side of the store. The entire building is brilliantly lighted by gas and electricity, including the floor showcases and show windows. On the second floor, which is devoted to Stoves, Ranges, &c., in front is a display platform, on which seasonable goods are exhibited. The third story is used as general storeroom for all surplus and unseasonable goods. An elevator runs from basement to the top floor.

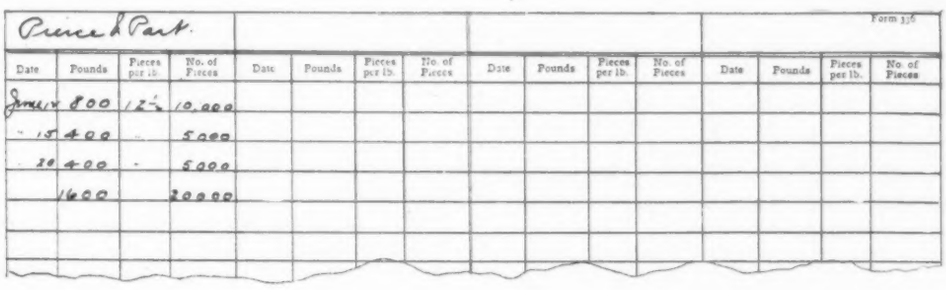
Rupp & Dietz have succeeded Zimmerer & Co. in the Hardware, Stove, Glassware and Paint business at Seward, Neb. This business was established 31 years ago.



Production Order No.	Department No.	Date of Order	Register No.
2000-A	33	June 10-03	1400

	SCRAP	
	Date Rec'd	Pounds
20 M Brass Plates	June 20	500
Est # 700		

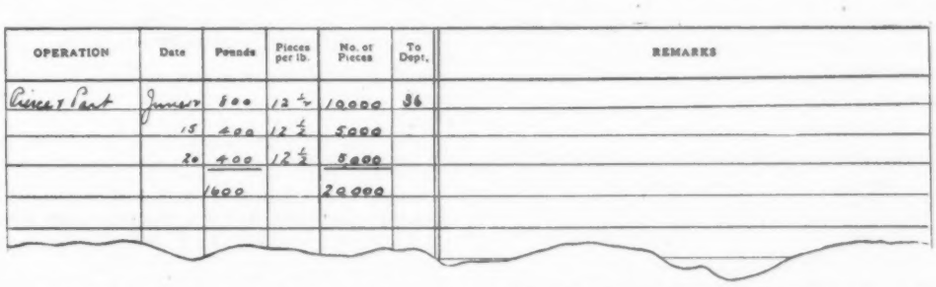
Fig. 24.—Production Order Record Kept by Foreman of Department. Size of Card, 5 by 8 Inches.



Pieces & Part. Form 336

Date	Pounds	Pieces per lb.	No. of Pieces	Date	Pounds	Pieces per lb.	No. of Pieces	Date	Pounds	Pieces per lb.	No. of Pieces	Date	Pounds	Pieces per lb.	No. of Pieces
June	800	12½	10,000												
" 15	400	"	5000												
" 20	400	"	5000												
	1600		20000												

Fig. 25.—Back of Production Order Record (Fig. 24), Showing Deliveries Made by the Department on the Order. Size of Card, 5 by 8 Inches.



OPERATION	Date	Pounds	Pieces per lb.	No. of Pieces	To Dept.	REMARKS
Pieces Part	June	800	12½	10000	36	
	15	400	12½	5000		
	20	400	12½	5000		
		1600		20000		

Fig. 26.—Manner in Which Deliveries on the Order as Entered on Production Order Record (Fig. 24) Are Also Entered on Back of Original Production Order (Fig. 19). Size of Sheet, 5 by 8 Inches.

Mr. Rupp was formerly the junior member of the firm, and Mr. Dietz bought Mr. Zimmerer's interest.

TRADE ITEMS.

ALBERT J. BARNES, for many years manager of the Whitman & Barnes Mfg. Company's New York branch, is now on his way to Australia, via San Francisco, having recently sailed from that port. This is the second extended trip around the world by Mr. Barnes in the interest of the company. This trip is expected to cover a period of about two years, his time being spent, it is intended, largely in New Zealand, Australia and South Africa.

THE REED & AUERBACHER COMPANY have been incorporated under the laws of New Jersey to carry on the general Hardware business as heretofore conducted by the firm of Reed & Auerbacher, 229 Bowery, New York. The business has an authorized capital stock of $20,000, all paid in, and will be continued at the above address as in the past. The officers, who are likewise the incorporators, directors and sole stockholders of the company, are Charles A. Bollerman, president; Helen R. Auerbacher, widow of the former proprietor, vice-president, and Thomas J. Coakley, secretary and treasurer.

THE *Hardware Dealer* is the name of a new Canadian trade paper, the first edition of which appeared October 31. Its purpose is to print the news of the Hardware trade of interest to Canadians. It is published weekly by the Burnside-Smith Publishing Company, 107 Coristine Building, Montreal. The men composing the company, which was recently incorporated by Dominion charter, are G. G. Foster, K.C., of Foster, Martin, Archibald & Mann, barristers; F. Bacon, Canadian agent for the Crucible Steel Company of America; J. T. Paterson of the Paterson Mfg. Company; H. R. Smith, stock broker; D. Burnside and Edgar M. Smith. A good deal of attention is given in an interesting and intelligent manner to the development of Canada's manufactures in the Hardware and Iron field.

HENRY KAHN & Co., 189 Broadway, New York, in calling attention to new and improved models of their Rotameter, as illustrated in these columns within the current year, also refer to the complete line of scientific instruments of precision for use in machine shops and kindred works they carry in stock, in addition to a stock of optical and photographic goods. The Rotameter is a device made with both and 1 and 1½ inch dials, designed for measuring surfaces in machine shops, &c., by merely running a lower projecting wheel any distance up to 25 feet, and in appearance is something like a watch.

THE indefatigable persistency with which Sargent & Co., New Haven, Conn., and 147-151 Leonard street, New York, advertise their Gem Food Chopper is further exemplified in a booklet just issued, on the eight pages of which are presented testimonials from 60 users, principally women, which are shown on figures representing medals, about the size of a silver dollar.

THE NORTON TOOL COMPANY, West Park, Ohio, who have heretofore confined their product to Hatchets, Broad Hatchets and Broad Axes, have completed arrangements for the manufacture of Chopping Axes, and will be in the market for the season of 1904.

IN our last issue we mentioned a number of promotions which have lately been made by the Gray & Dudley Hardware Company, Nashville, Tenn. In addition W. F. Stephenson, who has been connected with the company for a great many years, has been elected to the position of manager of the company's Birmingham house, succeeding H. H. Mayberry. Mr. Mayberry will engage in the banking business at Birmingham, but will continue identified with the company as director.

A LARGE stock of Heavy Hardware stored by the Belcher & Loomis Hardware Company of Providence, R. I., was damaged by water in a fire which gutted the establishment of R. M. Canfield, manufacturer of asbestos covering for steam and furnace pipes, Monday, the 9th inst. As most of the Hardware was in cases and was covered by the protective department early in the fire, it is not thought that the loss will be heavy. Mr. Canfield's loss is estimated at about $10,000.

CONTENTS.

BRITISH LETTER.

Offices of *The Iron Age*, HASTINGS HOUSE, NORFOLK ST., LONDON, W. C., October 31, 1903.

The Week's Hardware Trade.

THE record for rain has now been passed before October is out, and there can be no doubt that the heavy and continued downpour has done incalculable mischief to business as well as damage to property. Storekeepers in the large towns are loud in their complaints of the falling off in their turnover. Retail Hardwaremen in the rural districts have been equally hard hit, for farmers, who with a little spare cash buy various metal goods, have been so financially hurt with the unsatisfactory season that economy is the order of the day. The increased demand for culverts, drain pipes and structural iron work of several kinds to replace buildings destroyed by the floods is practically no compensation. The temporary stoppage of building work and the severence of communications in all parts of the country more than counterbalance this in itself.

In the export department business appears to be fairly well maintained, considering the advanced period of the year and the approaching close of a good deal of Northern navigation, but there is a downward tendency of orders from South Africa, and we recover business with the Australian colonies but slowly. Trade with Canada has been fairly brisk, as it generally is before the closing of the river. The Dominion trade is now over. Some curiosity is exhibited as to the actual commercial effect of the Alaska boundary award. Not a few far-sighted Englishmen are of opinion that the award in the long run must bring Canada closer to the States, notwithstanding any momentary irritation.

Recasting Cable Codes.

The principal business houses here are gradually perceiving the necessity for recasting their telegraphic code systems, in order to avail themselves of the enormously increased power of economical telegraphy placed in their hands by the decisions of the recent international convention. Although the new rules do not come into force until next July, many firms, even though they have already taken this task in hand, will find it very hard to be ready to date. The regulation permitting all pronounceable aggregations of ten letters to be cabled as one word each will mean a saving in many instances of thousands of pounds on the annual bill for telegraphic expenses, and will incidentally increase the range and promptitude of the cable systems themselves. With an increased quantity of telegraphic correspondence will go a reduced call upon the resources of existing cables, and the new regulation will be equivalent to a saving of millions upon capital expenditure for new wires.

New Agencies Secured.

William Cruger Cushman of the firm of Cushman & Thomson, American agents, of Aldersgate Buildings, Aldersgate street, London, E. C., has just returned from a visit to the United States, where he has strengthened previously existing trade connections, and has secured the agency for a number of new houses. Among the new firms now represented by Cushman & Thomson are the Lansing Wheelbarrow Company, Lansing, Mich.; Keuffel & Esser Company, 127 Fulton street, New York; Erie Specialty Company, Erie, Pa.; the National Specialty Mfg. Company, Philadelphia; Bonney Vise & Tool Works, Philadelphia; the Continental Tool Company, Frankfort, N. Y., and for the Thomas Lawn Mowers.

The Chance of a Prize.

American readers of *The Iron Age* concerned with the metal trades may be interested to know that a prize is offered by the Society of Arts of Great Britain, under the terms of the Benjamin Shaw Trust, to consist of a gold medal, or $100, for the best dust arresting respirator for use in dusty processes and in dangerous trades. The apparatus is intended merely to arrest dust; it is not to be a chemical respirator. It might be light and simple in construction, inexpensive, so as to admit of frequent renewal of the filtering medium or of the respirator as a whole; it should allow no air to enter except through the filtering medium, nor should it permit expired air to be rebreathed. The filtering medium should not offer such resistance as to impede respiration when worn for a long time; and it is desirable that the respirator should be as little unsightly as possible. Inventors intending to compete should send in specimens of their inventions not later than December 31, 1903, to the secretary of the Society of Arts, London.

A Calculation of Factory Cost Under a Protective Tariff.

A Hardware manufacturer, who does not care further to disclose his name, makes an interesting calculation, basing an argument upon it, as to the effect upon factory production of a protective tariff. The argument is ingenious, and is, of course, applicable on both sides of the Atlantic, and if running to rather more than usual length, it is at least worth some study:

THE PREMISE.

One hundred of anything can be made cheaper than 1, 1000 cheaper than 100, 10,000 cheaper than 1000, and 100,000 cheaper than 10,000, albeit not in the same ratio, but still cheaper to ad infinitum.

The rate of manufacture fluctuates in most businesses from time to time. Quickening up, unless it is natural and gradual, or slowing down, adds to cost. The more violent the fluctuation in output, the greater the cost. Slowing down not only costs money as a factory process in itself, but also adds to the cost of each article produced as compared to the previous cost at a more rapid rate of output—normal conditions of environment remaining, as they almost invariably do.

Cheapness of production is limited by demand which limits quantities and therefore cost.

Selling prices are ruled by the law of supply and demand, but only so long as artificial conditions are not introduced.

The living margin of profit is soon reached, and demand balancing in its turn supply, the scales of trade ride about their beam from day to day and from year to year.

The living margin of profit can be, and is, secured internally by nations by means of tariffs, and the lowest possible internal cost of production, regulated by internal supply and demand, can only be reached while the greatest possible internal employment is given, and the greatest purchasing powers conferred on that community.

Over production cheapens cost, but it also cheapens selling prices, more often than not to such figures as to wipe out the margin of living profit and to create a dead loss.

The cost of production may be summarized under three great heads:

1. Raw material.
2. Productive (actual expended manual) labor.
3. Factory establishment charges (hundreds and hundreds of subdivisions to these) and selling charges.

The proportion of these to one another fluctuates enormously in different businesses, but in manufacturing ventures the last named, if correctly analyzed, seldom falls short of one-third of the whole, and is frequently a great deal more. Moreover, on the whole, it is in nearly all factories a constant figure, in a great measure uninfluenced by rate of production, and more especially by sudden fluctuations in rate of production.

THE ARGUMENT.

The cost per article over a given time in widely differing quantities, therefore, works out thus: £90,000 worth, at cost, over any given period, would represent only one-half of the goods represented by £150,000, at cost, over the same period; or, in other words, the cost per article would be about 17 per cent. each less. This will be made clearer by tabulation:

30,000 ARTICLES.

1	Raw material, 30,000 at £1	£30,000
2	Productive labor, 30,000 at £1	30,000
3	Charges, say fixed (as above)	30,000
		£90,000

Cost per article, £3.

60,000 Articles (Over Same Period).

1	Raw material, 60,000 at £1	£60,000
2	Productive labor, 60,000 at £1	60,000
3	Charges, say same (see footnote)	30,000
		£150,000

Cost per article, £2 10s.
Saving per article, 10 shillings.
Saving on previous cost, 16.6 per cent.

NOTE.—It is assumed above for the sake of avoiding mathematical complications—though for quite legitimate reasons—that the third factor in cost has not risen with the quantity manufactured, which would not be strictly true; but as the great addition to the quantity made would (as it ought to and does) permit of the purchase of the raw material at better prices, and the more economic application of productive labor, any likely addition would be quite offset by these two important savings, and the result would, to all intents and purposes, be as represented above. The percentage of saving is, however, in itself quite sufficient to allow of a large margin to those who may believe it to be necessary.

The necessity for a living margin has already been shown to limit the rate, and, therefore, the cost of production. It, therefore, follows that manufacturers cannot, in making or revising prices, go to figures which eliminate this margin. This absolutely necessary margin can only be secured to the whole wide world by free exchange, or, in an individual country, by a tariff wall.

The tariff wall secures the margin at home. It also, in an extraordinary measure, while there are free markets outside, insures immunity from the consequences of over production, because such free markets provide a field for its absorption at prices which makers in that market (they not having secured to themselves a margin, and having voluntarily limited their rate of output by legislating themselves into an abject slave to the natural law of supply and demand) are unable to follow, because they have cut off from themselves, by neglect of protective measures, taxation, or any other alternative, the certain security of the living margin, and the greatest possible production necessary to get the lowest possible cost.

Tariffs cheapen the home prices of the protected country. It has already been shown in the example given that it is possible to produce twice as much for £150,000 as for £90,000. Granting that the quantity represented by £90,000 is the legitimate requirements of the protected country, the fact remains that that half can be had at a cost of £75,000 instead of £90,000 if a "free" country can be found to take the overproduction which the professor of economics insists should recoil on the heads of the overproducers. But whether either the protected home consumers or the bloated home manufacturer gets the difference of that £15,000, yet, as he is one of that community, his country gets in deed and in fact that £15,000, and yet another £15,000 since we have been speaking of the half, and that country in addition gets £30,000 more money in labor and possibly all, but certainly a part of the £30,000 worth of extra materials.

The protected manufacturer, by selling the larger production at, say, 10 per cent. profit (which gives the handsome sum of £15,000, equaling the impossible percentage of 16¾ on the smaller production), becomes twice secure. There is no question of a loss on any part of his production.

The protected community get £60,000 in wages instead of £30,000, the protected community either directly or indirectly may buy for £82,500 what otherwise would have cost them £99,000. The unprotected (our home) manufacturer, enjoying no equal manufacturing advantages, goes out of business and loses £9000 profit, but (it may be argued blindly) the unprotected community get for £82,500 or less what they might have had to pay £99,000 for. According, therefore, to the man who would buy cheap with nothing in his pocket wherewith to buy, they have a gain of about £16,000, but they have lost at least £60,000 in wages, which they might have had if they had been the armed men instead of the unarmed men. They have also lost £30,000 in material and the possibility of a further £30,000 from the same source. The net result is a total loss to the free imports country of at least £100,000, instead of a gain of £165,000, had the conditions been reversed.

Careful students of this argument, however, will note two factors which, from the free trade point at least, vitiate the whole:

1. It is assumed that there is an actual loss of wages, because the men concerned do not make the particular commodity in which this manufacturer is interested. He must first prove that they would be actually in a condition of unemployment before he can argue as to any loss, nor does he recognize that labor is a commodity which must be paid for, and should therefore go to the debit balance in estimating the cost of any article.

2. The free trader is emphatic that, with trade transacted behind a tariff wall, the actual volume of trade done is seriously restricted. My observation over here in connection with the tariff discussion now proceeding is that every man is a protectionist in regard to his own industry, but a free trader in regard to all others.

The Extent of South African Trade.

The figures are now available showing the business done in Cape Colony and Transvaal for the seven months ended July 31. In Cape Colony, although the increase is steady, the development is not so rapid as was looked for when the war closed. The total value of imports, including specie and articles imported for the Colonial Government, was £21,507,000, against £18,679,000 for the corresponding period of 1902. The most gratifying feature is the advance under the head of Metals and Metal Manufactures—including Iron, Lead, Machinery and Hardware—in which the trade during the first seven months of this year represents a value of £2,412,000, as compared with £1,635,000 for the seven months of last year. An extraordinary increase is shown in corn and grain, the value of imports having been £1,818,000, against £911,000. An explanatory note under this head would be of service as indicating the cause of such imports into a practically agricultural region. Our total abstinence friends will be pleased to hear that alcoholic beverages have decreased from £553,000 in 1902 to £395,000 this year. In exports Cape Colony shows the respectable aggregate of £14,250,000, of which gold ranks for £6,311,000, and diamonds for £3,152,000.

Turning to the Transvaal, it is interesting to note that trade there is increasing more quickly than in the Cape, the value of imports during the seven months ended July last having been £12,996,000, against £5,322,000 for the corresponding period of 1902. Here, again, the greatest advance is in metals and manufactures, the value being £2,743,000, against £1,173,000 for the first seven months of last year. Provisions, corn and grain and leather manufactures all show very large increases. These official returns would be very much more valuable if they showed not merely the trade done in the two periods, but also the countries with which the trade is done. It is curious to note how evenly the value of merchandise imported into the Transvaal is divided between Cape Colony and Natal. The former took £5,330,000 worth and the latter £5,562,000, the balance of the business entering by Delagoa Bay.

South African Shipping Rings.

An exceedingly important trial will soon come to issue between the firm of Houston & Co. and the British & South American Steam Navigation Company, Limited, on one side, against a number of ship owners and agents who constitute what is known as the "South African Shipping Ring" on the other side. The plaintifis allege, among other things, against the defendants "coercion and intimidation of their customers in South Africa." It has been agreed that a prominent barrister shall proceed to South Africa to take evidence as a commission and to deal with the whole of the South African facts. When this commission reports there will be plenty of excitement.

The Most Favored Nation Treaties and British Commerce.

A Government return, showing the most favored nation clauses in existing treaties of commerce between Great Britain and other Powers in force on July 1, 1903, has just been issued. In regard to China, the British Government and its subjects are confirmed in all privileges, immunities and advantages conferred on them by previous treaties, and it is expressly stipulated that the British Government and its subjects will be allowed free and equal participation in all privileges, immunities and advantages that may have been, or may be hereafter, granted by His Majesty the Emperor of China to the Government or subjects of any other nation. It is agreed that subjects of the two Powers shall each within the territories of the other enjoy all the privileges, immunities and advantages that may have been, or may hereafter be, accorded to the subjects of any other nation. It is stipulated that the British Government, public officers and subjects shall, from the day on which this treaty comes into operation, participate in all privileges, immunities and advantages, especially in relation to import or export duties on goods and manufactures, which shall then have been granted, or may hereafter be granted, by His Majesty the King of Corea to the Government, public officers or subjects of any other Power. By arrangement with Russia in all matters relating to commerce and navigation Russian subjects shall, in the British dominions, be entitled to every privilege, favor and immunity which is actually granted, or may hereafter be granted, to the subjects or citizens of any other Power; and His Majesty, actuated by a desire to foster and extend the commercial relation of the two countries, engages that any privilege, favor or immunity whatever in regard to commerce and navigation which his Imperial Majesty has actually granted, or may hereafter grant, to the subjects or citizens of any other State, shall be ex-

tended to the subjects of Great Britain. With reference to the United States, it is provided that no prohibition shall be imposed upon the exportation or importation of any articles the growth, produce or manufacture of the United States, of his Britannic Majesty's territories in Europe, to or from the said territories of his Britannic Majesty in Europe, or to or from the said United States, which shall not equally extend to all other nations.

Hints for Exporters to Russia.

A trustworthy Austrian agent has just been putting into black and white some hints how best to capture Russian trade. "As a rule," he says, "the Russian merchant knows nothing of the factory to which he gives orders, but only the *agent de place*. . . . Several agents do not inform their customers of the source of supply; they themselves deliver the goods and collect the debts. Hence under no circumstances should exporters neglect to make inquiries about the representative." The Consul suggests that the exporter's own traveler in company with the agent should regularly visit customers. It is in the highest degree important that samples should be submitted at the right moment. Of course, the time varies with the class of goods; for instance, the buying-in season for summer goods (St. Petersburg) falls in January and February, for winter articles in August and September. Even commodities independent of the seasons are then purchased. There is little business doing in April and June, likewise in the times immediately before and after Russian festivals. The Russian merchant usually expects the quotation to be "franco consignee," duty included. In quotations, "at factory," or "free frontier," the prices should be reckoned not in roubles, but marks. Another item of importance is the scrupulously exact filling up of the customs declaration. Cost of packing should be included in the quotations. If delays arise as to payment, customers should be approached by letter (in Russian language) direct.

AUSTRALIAN NOTES.

FROM A SPECIAL CORRESPONDENT.

THE month of September has been more favorable to traders than its recent predecessors, and there are strong indications that buyers are taking heart of grace. The outlook is steadily improving, copious general rains fell in the various States during September, and it will be a cruel hardship if the promises of an excellent harvest do not materialize. Harvesting requirements, Fencing and Shearing Supplies are in fair demand.

WIRE NETTING.—The employees of Lysaght Bros. & Co. of Sydney and Melbourne, some 400 in number, have approached the Minister of Customs (Sir William Lyne) with a view to securing a bonus on their manufactures, or a duty sufficiently high to enable them to compete successfully in the Australia market with German goods. It appears that Germany grants an export bonus of 15 shillings per Wire mile, with freights on subsidized steamers from Bremen to Fremantle at 10 shillings 6 pence per ton. Australian coastal freights are high by comparison, it costing about 20 shillings per ton from Sydney to Melbourne. The Minister received the deputation sympathetically, and while not holding out hope of duty, thought that possibly something might be done in the way of a bonus.

BUILDERS' HARDWARE, throughout Australasia, is likely to have a good season. The trade seems to have taken a sudden new spurt, doubtless owing to the improved outlook.

MCLEAN BROS. & RIGG'S Melbourne stock has been purchased by Ed. Duckett & Sons of Lonsdale street, Melbourne, at a price approximating 8 shillings in the pound. The value of the stock was about £33,000, and the retail stock, valued at about £10,000, has been sold to William McLean, for many years the managing director of the firm of McLean Bros. & Rigg, Limited, who will again open at 147 Elizabeth street, Melbourne.

FEDERAL CUSTOMS DECISIONS of interest to American exporters, and recently gazetted, are as follows: Magnesium Wire, free; Shoes and Dies, for Stamper Batteries, 12½ per cent.; Saw Setting Machine Tools, 12½ per cent.; Brazing Machine, for brazing vehicle tire wheels, 12½ per cent.; Screw Hooks of all kinds, free; Electric Cycle Lighting Sets, 12½ per cent.; Electrical Materials—viz.: Bolts, unattached, being parts of insulators accompanying them, free; India Rubber Cord, 15 per cent.; Vanner Belts, 12½ per cent.; Rubber Caps, for capsuling, 15 per cent.; Castors, not for furniture, 20 per cent.; Comb Cleaners (metal), for cleaning Combs of Reapers and Binders, 20 per cent.; Brass Drop Screws, for Lead Pipes, 20 per cent.; Oil and Gas Engines, 12½ per cent.; Saw Swage Jumper, or upset, 20 per cent.; Glass Shades for Arc Lamps, 20 per cent.; Soldering Irons, free; Grips, Cord, Wood, electric, 12½ per cent.; Center Hinges, 20 per cent.; Electric Pocket Lamps, 15 per cent.; Picks, railway beater, 20 per cent.; Spike Drawers, 20 per cent.; Tape, for fuse making, free; Electrical Porcelain Tubes, free.

GERMAN HARDWARE AND IRON NOTES.

(FROM A SPECIAL CORRESPONDENT.)

THE Austrian and Hungarian Copper Sheet works have reduced the list price for Copper Sheets by 5 kronen (about $1) to 190 kronen, in spite of the rising tendency in raw Copper.

The syndicate of German Wire Nail manufacturers has met in Berlin and has just published its report for September, 1903. The volume of trade has materially increased, amounting to 50 per cent. increase over the month of August. The reason for this activity is stated to be that the trade has been compelled to give up its waiting attitude and to cover the most necessary requirements for the fall and winter months.

Another reason given is the personal intercourse had lately between the members of the syndicate, their representatives and the trade, which set at rest the alarming rumors regarding the future of the market. The export trade is said to have improved likewise.

TIN PLATE SYNDICATE.—It is reported that at the last meeting of the German Tin Plate Association it was resolved to continue the association. The syndicate has settled all differences by allowing a Pilesian firm (about whose deserved share of the business there were diverging opinions) a larger quota than they had before. How this larger quota is to be distributed is still a matter of negotiation. German Tin and Terne Plates are depressed, and deals are made below syndicate prices, especially on Coarse Ternes.

AMERICAN HARDWARE is still in fair demand, although there are more and more tools and utensils made after the American shapes, and they are outwardly not unlike the American goods, although frequently the quality is much inferior.

A Remscheid factory makes a line of Breast Drills, Ratchet Drills, &c., looking so much like the Millers Falls and Mason & Parker line that upon first sight one would think the electros in the German manufacturers' catalogue had been lent by the American makers.

Another factory is making Pliers of stamped steel identically the same as the Lodi Pliers, but at a ridiculously low price, and it takes a good judge to tell them apart.

Washing machines are a big article in Germany, but the shapes and styles in use here are entirely different from the American. The German machines have very short feet and stand almost upon the ground. The American machines have high legs and smaller tubs than the German. Besides this, the German duty, 30 marks (about $7.50 per 100 kg.—220 pounds) is prohibitive. Very likely the tubs alone could be shipped and imported here if packed in the knocked down fashion and unjapanned, and neither painted nor lacquered, and then made up after German specifications.

A very alarming feature in the German Hardware trade is the enormous advance in Hickory Handles,

which form a large part of the American import trade here and are handled by every Hardware and Tool store. Years ago German and Hungarian Ash Handles were used for Hammers, Hatchets, Miners' Picks, Axes, &c. Gradually the people have become accustomed to American Hickory, and have discarded all other woods for this purpose. Now there is such an advance that the trade is greatly alarmed, and substitutes are looked for.

There is a similar and worse situation in Ash Handles. These apparently cannot be had at all, and the German Hoe and Fork syndicate therefore make large deliveries of Tines only. These Fork Tines have a sort of a spring ferrule to which any stick or handle can be easily adjusted.

It is desirable that the American syndicate should look into this Fork Tine question once more, for there are unlimited possibilities in that direction, providing a competitive article can be made and the Americans are ready for a fight. The Germans will not give up that ground easily. Hay and Dung Forks, Hoes, &c. are a very large article on this side.

GOVERNMENT HELPS TOWARD EXPORT TRADE.

THE Daily Consular Reports, published by the Department of Commerce and Labor, Washington, D. C., from United States Consuls all over the globe contain much valuable matter for manufacturers and exporters who wish to expand their foreign commerce. Most of the reports contain suggestions on "How to Increase American Trade," and give names of dealers and addresses from which a mailing list can be made, information in regard to duties on the goods discussed, articles finding place in the markets in question, &c. The Government will, on request, mail these reports free of charge to those interested.

HERMAN BEHR & CO.'S FIRE.

HERMAN BEHR & CO., 75 Beekman street, New York, manufacturers of Sand and Emery Papers, Glue, &c., whose factories are in Brooklyn, suffered a partial loss of their plant Monday noon, November 9, by fire which started, it is thought, through the carelessness of some electricians, who were using a candle in the mixing room on the second floor of the building. Energetic work on the part of the fire department saved portions of the plant, among which are the boiler house and chimney and some minor buildings. The concern will rebuild at once on similar lines, but with larger capacity and more substantial construction. They are seeking temporary quarters in the neighborhood and hope to be in fair shape soon. In the meantime they have a fairly good stock in New York and at their Boston and Chicago branches, together with some uninjured merchandise at the factory, with which to keep their trade supplied.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers issuing new catalogues or price-lists are requested to send to THE IRON AGE *two copies—one for the Catalogue Department in the New York Office, and one for the Iron Age Library of Trade Literature in London.*

BROWN & SHARPE MFG. COMPANY, Providence, R. I.: Circular devoted to illustration and description of Mercury Plumb Bobs. The comparatively small diameter of the Bobs allows them to be used close to corners and walls.

PITTSBURGH STEEL COMPANY, Pittsburgh, Pa.: Catalogue illustrating Pittsburgh Perfect Railroad Fences, Fence Staples, Two and Four Point Barb Wire, Hinge Gates, &c. It also presents views of their large and finely equipped plant.

HILL DRYER COMPANY, Worcester, Mass.: Illustrated circular describing the Hustler Ash Sifter, which fits an 18-inch iron ash can, flour barrel or chute. It is referred to as being a great saver of coal, and not throwing dust on the clothing or in the eyes of the operator. The circular also refers to Hill's Clothes Dryers for balcony, roof and yard, and the Universal Rotary and Shaker Ash Sifters and Garbage Chutes.

RABIGER BROS. & Co., 237 East Johnson street, Germantown, Philadelphia, Pa.: Catalogue devoted to Rabiger's Patent Fillet Tool. The firm have added a third size, made extra strong to meet the requirements of tube works, rolling mills, &c., where rough but exact cuts are wanted.

BOCK WRENCH MFG. COMPANY, Garwood, N. J.: Catalogue and price-list illustrating Bock's Standard Pipe Wrench, Yankee Pipe Wrench, Flange Wrench, Spanner Wrench, Single and Double Headed Forged Steel Engineers' Wrenches and Steel Forged Screw Wrench.

BARKER, ROSE & CLINTON COMPANY, Elmira, N. Y.: Illustrated folder relating to Soles, Sole Leather Strips, Boot Taps, Heels and Safety Heel Plates.

A. E. STEVENS & Co., Portland, Maine: Price-list No. 26, devoted to Wood Hub, Warner and Sarven Wheels, Hubs, Spokes and Rims. The firm also iron Wheels, box Hubs, weld and set Axles, &c.

SAWYER TOOL COMPANY, Fitchburg, Mass.: Circulars relating to Tool Makers' Hardened Square and the Prouty Wire Valve Wheel.

DIAMOND SAW & STAMPING WORKS, Buffalo, N. Y.: Roll top desk calendar for November, with reference, on the reverse side, to Sterling Hack Saw Blades. Also circular relating to Sterling Hack Saw Frames.

HAZARD MFG. COMPANY, Wilkes-Barre, Pa., New York office and warehouse 50 Dey street: Catalogue illustrating Wire Rope for a large variety of purposes. The company keep on hand all sizes and kinds of Iron, Steel and Galvanized Rope; Single and Double Galvanized Strand; Galvanized Telegraph and Telephone Wire, Wire Rope Clamps, Clips and Thimbles, Wire Rope Sockets and Hooks.

MICHIGAN SPROCKET CHAIN COMPANY, Detroit, Mich.: General Catalogue No. 2, illustrating Standard Detachable Link Chain Belting, special styles of Extra Heavy Chain Belt, Malleable Iron Buckets, Sprocket Wheels, Elevator Arms, &c.

QUEEN ANNE SCREW COMPANY, Burlington, Vt.: Illustrated catalogue for the season of 1904, devoted to different styles of Screen Doors and Window Screens.

PITTSBURGH TOOL & DROP FORGE COMPANY, 1402 Arrott Building, Pittsburgh, with works at Cheswick, Pa.: Catalogue illustrating Solid Steel Mining Tools for coal, fire clay, rock and slate; Wood Post Drills. Also catalogue devoted to Track Tools, including Hammers, Spike Pullers, Swages, Punches, Sledges, Mauls, Bars, Picks, Rail Tongs, Wrenches, &c.

DETROIT TWIST DRILL COMPANY, Detroit, Mich.: Catalogue and price-list devoted to Graham Twist Drills and Chucks; also all kinds of Drills, Reamers and Special Tools. The catalogue cancels all previous issues.

INDEPENDENT REGISTER COMPANY, Cleveland, Ohio: Illustrated catalogue and price-list of Registers and Ventilators, Gas Heaters, Stove Pipe Radiators, Adjustable Thimbles, Ceiling Plates, Register Fenders, Stove Casters, Sad Iron Heaters, Breast Strap Slides, &c.

THE NATIONAL-ACME MFG. COMPANY, Cleveland, Ohio: Catalogue and price-list of the product manufactured by the company, which includes Set, Cap and Machine Screws; Iron Studs, Coupling Bolts, Nuts, &c. The company also do special work, of which a portion is illustrated, and state that they have special facilities for turning out brass work.

WHITE, VAN GLAHN & Co., 15-17 Chatham square and 49 East Forty-second street, New York: Catalogue No. 26, devoted to Wood Carving Tools. The firm are sole agents for the United States for J. B. Addis & Sons' Wood Carving Tools. These are illustrated with prices, together with Carving Tool Handles, Carvers' Mallets and Markers, Files and Rasps, Oil Stones, Carriage Clamps, Sloyd Knives, &c.

MUTUAL FIRE INSURANCE FOR MISSOURI MERCHANTS.

THE MISSOURI RETAIL STOVE AND HARDWARE DEALERS' ASSOCIATION, who have been considering for some time the formation of a mutual fire insurance company, have encountered certain obstacles and are not yet in a position to begin operations and write policies. F. Neudorff, secretary, St. Joseph, announces, however, that a contract has been made with the Minnesota Retail Hardware Dealers' Mutual Fire Insurance Company to carry the policies of Missouri merchants until such time as the unearned premiums reach the amount needed to comply with the Missouri law, when the business will be turned over to the Missouri Association. In the meantime those who insure with the Minnesota Company will share in all the profits accruing to membership in this successful company, who have during the four years of their existence saved their policy holders 25 per cent. of the premiums paid and created a reserve fund in addition. We understand that all the officers and a number of the members of the Missouri Association have already taken out policies in the Minnesota Company. Those desiring further information, application blanks, &c., may write to M. S. Mathews, secretary, Boston Block, Minneapolis, who will be pleased to furnish full advices.

IMPROVEMENTS IN PLASTERING AND BRICKLAYERS' TROWELS.

HENRY DISSTON & SONS, Philadelphia, are calling special attention to new improvements in handles in their Plastering and Bricklayers' Trowels. On the Plastering Trowels they show an inlaid cork handle which gives a very satisfactory grip to the handle and permits any necessary moving or shifting in the hand without rubbing or chafing. Henry Disston & Sons also make their "Sure Grip" Handle for both Bricklayers' and Plasterers' Trowels. This is inlaid with a covering of pure rubber, giving a firm hold on the handle and prevents slipping, particularly when the handle becomes wet. Patents have been applied for on both the above.

MISCELLANEOUS NOTE.

Winchester Repeating Arms Company.

The Winchester Repeating Arms Company, New Haven, Conn., have adapted their Model 1895 box magazine rifle to the new Winchester .405 cartridge. This rifle is provided with a 24-inch round nickel steel barrel, and the magazine holds four cartridges besides that carried in the chamber. This cartridge is loaded with a 300 grain soft point metal patched bullet and special smokeless powder, which gives the bullet a muzzle velocity of 2204 feet per second.

The Niagara Combined Picket Pin and Swivel.

The picket pin shown in the accompanying cut is all steel and is referred to as stiff, strong and light. All parts, it is explained, work freely, not rusting tight,

The Niagara Combined Picket Pin and Swivel.

giving way or getting out of order. It is pointed out that the pin goes easily into all ordinary soils by hand and foot, requiring no mallet; that it enters the ground clear to the swivel, leaving nothing sticking up for the rope, lariat or chain to wind around. The pin, it is remarked, secures a strong hold on the soil, for whichever way the animal pulls it presents a broad surface to the ground, and even in soft soil sticks and holds. In pulling out the swivel turns straight up, in which position the pin draws out easily. The device is offered by the Metal Stamping Company, Niagara Falls, N. Y.

The Hustler Sifter.

The ash sifter shown in the accompanying cuts is of the rotary type, made of heavy galvanized iron with an extra heavy galvanized fire sieve, the under side of the

Fig. 1.—The Hustler Ash Sifter.

latter being shown in Fig. 2. The sifter is made to fit an 18-inch iron ash can, flour barrel or chute. In Fig. 2 may be seen the hook upon which the hod is hung, into which the sifted coal is conducted, while the ashes fall into the

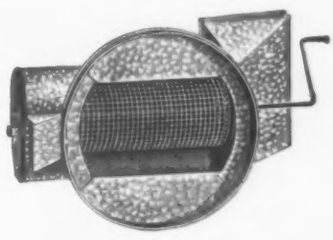
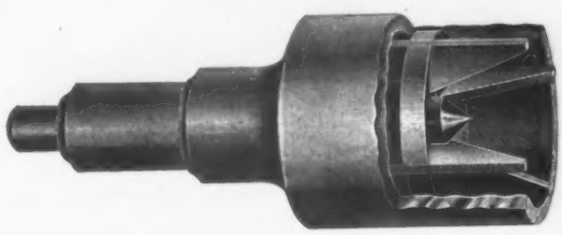


Fig. 2.—Under Side of Hustler Sifter.

barrel. The device is offered by the Hill Dryer Company, Worcester, Mass., who allude to it as sifting the coal clean of ashes and as not throwing the dust and dirt on the clothing or in the eyes of the person using it.

Goodell Improved Bell Centering Punch.

The bell centering punch herewith shown, put on the market by the Goodell Mfg. Company, Greenfield, Mass., is designed by its construction quickly and accurately to center both round and square stock. It is explained



Goodell Improved Bell Centering Punch.

that with only four bearings to touch the work, and the guide following close to the point of the punch, there is comparatively little liability of its being thrown out of center by any unevenness of stock. The punch is made in two sizes: No. 1, centering up to 1-inch stock, and No. 2, centering up to 1½-inch stock.

Fairbanks' Wheel and Axle Attachment for Trucks.

The Fairbanks Company, Broome and Elm streets, New York, in a comprehensive catalogue of trucks for a large variety of purposes, recently issued, illustrate Fairbanks' wheel and axle attachment for trucks, here shown, and for which application for patent has been made. An important feature of this construction is that the wheels are attached from the inside and are cast with flange on the inner end of the hub which runs in a groove in bolster casting. The outer end of the hub is closed. The axle is of cold rolled steel with a smooth bearing surface.

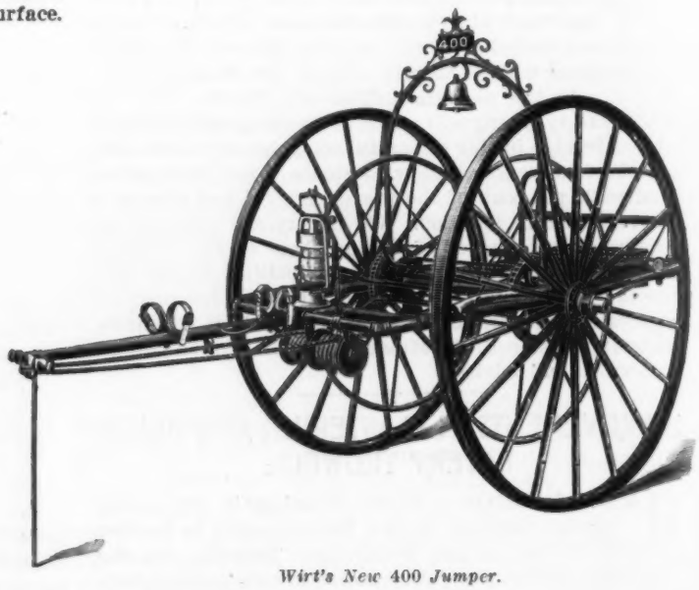
Fig. 1.—Improved Pattern of Railroad or Steamer Truck.

The bolsters are bolted to the handle in three places. They are formed with a flange on both sides to fit over the wood handle, thus protecting the handle while the elasticity of the wood is a protection to the bolsters from sudden shocks. Some of the advantages of this construction are that no cotter pins, flat keys or rivets are necessary, and there is nothing of this character to catch in obstacles. The wheels will not come off until purposely removed. As they are protected from dirt lubrication is easier and there is less friction. The axles, being made of shafting, are referred to as much stronger than square bars turned down at the ends for bearings and weakened by the customary holes for bolts, which are necessarily large, as two bolts have to stand the entire strain. As now made the strain on the axle is taken up by the three bolts on each bolster instead of one, as previously made. This important working part can be fitted to any body designed for use as a two-wheeled truck.

Fig. 2.—Wheel and Axle Attachment for Trucks.

Wirt's New 400 Jumper.

Wirt & Knox Mfg. Company, 22-24 North Fourth street, Philadelphia, Pa., are offering the jumper shown herewith. It is made with a tubular steel frame and



Wirt's New 400 Jumper.

reel, a chain winding attachment with adjustment winch handles for winding hose on the reel, and a clutch for holding the reel in position when the hose is on. The tubular steel arch is provided with polished brass ornaments and bell. The machine has a polished brass handle bar, lantern holder and rope reel heads, double nozzle holders on the tongue and 66-inch wood wheels with polished brass hub cups. The jumper is equipped with dray rope, fireman's axe, lantern and crowbar, and is referred to as handsomely painted and striped, and as strictly first class in every way. The capacity of the machine is 500 feet of 2½-inch rubber fire hose. The total length of the cart is 10 feet 8 inches; width, 5 feet 4 inches; hight, 7 feet, and weight, 600 pounds.

Eastern Pattern Hollow Back Scoops.

The Avery Stamping Company, Cleveland, Ohio, are offering the scoop shown herewith. The sides of the scoop

Eastern Pattern Hollow Back Scoops.

are not made on straight lines, but are slightly curved inward at the center of the blade. This is referred to as having a tendency to throw the slack or other firing material toward the center of the scoop and to insure safe delivery through the mouth instead of being scattered over its sides. The capacity of the scoops, it is explained, is unaffected by this departure from the usual shape, while a stylish appearance is imparted to the goods. The scoops are also called coal scoops, and are furnished in the following four grades: Never Break, National, Buckeye and Mohawk brands. The manufacturers state that the goods are made strictly on merit, the best materials and workmanship being employed.